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No. 6—The Clinical Aspects and Treatment of "Hoose" (Parasitic) and Allied Conditions in Cattle*

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For the purpose of this paper, "hoose" may be regarded as a parasitic disease of cattle, arising from the presence of *Dictyocaulus viviparus* in the respiratory tract.

Although we are dealing mainly with the clinical aspects of the disease, a brief consideration of the parasite responsible, and its life-history, will give us a better understanding of its mode of entrance, resistance to external conditions and its reaction to therapeutic treatment.

D. viviparus is a fine, milky-white, thread-like, worm. The male measures 4–5·5 cm. in length and the female 6–8 cm. It occurs in the trachea and bronchi and in many cases can be found in moderate numbers in the smaller bronchioles, from which it can be expelled, on *post-mortem* examination, by squeezing the lung tissue. The eggs are about 85 × 35μ. They are embryonated when laid and hatch in the lungs or alimentary tract.

The first-stage larva, found in the fresh faeces of the host, is 0·3–0·6 mm. in length. The free-stage larvae do not feed, but exist on food granules contained within their bodies; hence they can retain their vitality for considerable periods outside the animal host, provided that there be sufficient moisture. They cannot withstand fairly low temperatures. Frost considerably lowers their vitality, but frosts of short duration may not be fatal. The third or infective stage is reached in about four days, with some variation according to temperature. The optimum is about 27° C.

Infection occurs by ingestion of third-stage larvae, usually during the night or early morning, when the dew is on the grass and the larvae are most active. Bright sunshine or drought retards the activity of the larvae, which then remain at ground level. They are able to exist in water, such as in tanks or in drinking troughs, and the latter, especially when situated in warm, sunny positions, may be a prolific source of infection. Under ordinary conditions, in this country, the larvae can exist outside the host for six months but in mild climates, as in S.W. England, where the atmosphere is humid and severe frosts rare, it appears that infection may be acquired, at any rate in a moderate degree, at almost any season and a few typical cases of "hoose" may be met with at any time of the year.

On reaching the intestine, after about three days' sojourn the larvae penetrate the bowel wall usually in the region of the colon, and reach the mesenteric glands. Here, a moult takes place and the fourth-stage larvae appear, males and females now being distinguishable for the first time. From the mesenteric glands, the fourth-stage larvae travel either *via* the lymphatics or blood vessels to the lungs, where they break through into the air passages and smaller bronchioles. A final moult takes place and the adult worm appears. The period from ingestion of larvae to the appearance of adults in the lungs is about six weeks; thus, cases of "hoose" occurring in the autumn have become infected probably during the warm summer weather.

Mönnig states that some larvae may pass through the pulmonary circulation and set up a pre-natal infestation in a foetus. This is analogous with the occurrence of ascarides in new-born puppies and accounts for the cases of "hoose" occasionally met with in calves of only a few weeks which have never been out of the house and are still on their mothers. In cold climates, infection has to be maintained by adult "carriers" grazing over the same land as, or being followed by, younger animals.

INFECTION

Certain farms, with low-lying and undrained meadows, and marshy ground, are notorious for the prevalence of "hoose," and it must be borne

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in mind that conditions favourable to *Dictyocaulus* are also highly suitable to the development of other parasites, notably the stomach worms, which may cause even more serious trouble.

The most dangerous period for grazing is night and early morning, whilst the dew is yet on the grass. During the heat of the day, the larvae, in sunny weather at least, leave the stems and foliage of the grass and seeking ground level, are less easily ingested. This applies particularly to long grass, as met with in summer and late spring. In overcrowded, small meadows, such as are common in S.W. England, the growth may be no more than a fresh nibble, and the climate being mild most of the year, cattle feeding close to the ground may develop infection at almost any time or even retain it throughout the year.

It seems probable, in the light of recent clinical experience, that larvae may be able to retain their vitality for considerable periods in hay, given suitable conditions. It is certain that the heat generated in the centre of a rick will be sufficient to kill the larvae but this does not apply to the outer portions and the top of the rick which, being the least valuable, are often thrown out to the calves and may contain larvae. The hay season of 1936 was a very bad one and in the writer's practice, many small farms, hitherto free, were subjected to very virulent outbreaks during the autumn. Apparently, this could be attributed to the fact that their own hay crop having failed, the owners were forced to purchase from other larger farms where the disease was rife. Several serious outbreaks were traced to hay from one particular farm.

In S.W. England, an additional factor in the spread of "hoose" is the common habit of grazing all cattle, young and old, over permanent pasture intended for hay and only removing them when it becomes imperative in the interests of the crop. Naturally, the greatest deposition of larvae occurs on those portions of the grazing where the cattle congregate most frequently; consequently the herbage in the vicinity of gateways is often heavily infected and as the ground in such situations is usually muddy and damp, the vitality of the larvae is considerably enhanced. Hence, hay cut from pastures recently grazed over, will carry a heavy infestation of larvae in such portions of the rick, outside the centre, as have been derived from these contaminated areas. The same reasoning applies to changing cattle into pastures which have been rested. In parts where the animals have congregated and manured them most heavily, there will the freshest grass grow; their footprints will have been instrumental in holding water and the herbage there will be most appreciated and shared at once by as many animals as may be able to gain access to it.

The purchase of farmyard manure may be responsible also for the introduction of disease from other premises, particularly when it is used on grassland. Manure from infested, housed cattle may induce an outbreak in young cattle grazing on the dressed land. The purchase of stock from an infected farm may be followed in warm weather, by the general spread of the disease throughout the previously healthy herd, within two months. Manure piles, which have been left untouched throughout the winter on farm roadways or in fields, will be surrounded by a luscious crop of grass in the following spring and the existence of warmth and moisture will be highly favourable to the maintenance of larval life.

Shallow, concrete drinking troughs, especially when fitted with a ball-tap, in summer may prove capable of collecting coughed-up embryos and providing suitable conditions for their further development. One outbreak, last autumn, was traced to a large roofed-in tank, which collected water from a road used by cattle from neighbouring farms. The water flowed from the tank, through a pipe fitted with a ball-tap arrangement, into a shallow concrete drinking trough.

No outbreaks had occurred previously on this farm, yet all the animals, including the milch cows, became affected, and in spite of every treatment, they showed no improvement until the source of infection was discovered and access to the water withheld.

Factors Influencing Resistance.

Breed.

Apparently no breed of cattle possesses any special degree of immunity to lungworm infestation, but, in most cases, the heavier beef breeds appear to offer a greater resistance to the effects of the parasites than the lighter dairy breeds, such as Guernseys and Friesians. On the other hand, it must be pointed out that with the modern tendency to produce beef at an early age, young cattle, intended for the butcher, usually receive better and more regular feeding than do young dairy cattle—which, too often, are left to fend for themselves until due for service.

Nutrition.

A setback during young life, such as an attack of white scour, or early malnutrition, undoubtedly increases the risk of the infection becoming dangerous to life.

Lack of good feeding during the first few months of life is probably the greatest factor in lowering resistance to parasitic invasion.

Overcrowding.

Small pastures, involving a great deal of

grazing over the same ground and close following-up, multiply the rate at which larvae are ingested. An additional factor, in this case, is the resulting shortness of the grass, which rapidly necessitates grazing at, or near, ground level.

A restricted water supply, such as from a trough or pool, may be an added danger. During the drought which occurred during the summer of 1929, all cattle in one area of the writer's practice had to be driven to water, to a pool about 20 yards wide and about 3 feet deep in the middle, throughout two months. By then, the whole of the cattle, of all ages, had become affected with "hoose." At the time, a batch of Irish cattle was distributed throughout the district. Many of these brought with them a non-parasitic lung affection, clinically resembling haemorrhagic septicaemia. The local cattle drinking from the same pool, contracted pneumonia from the strangers and this spread rapidly through the district, involving nearly every farm and many hundreds of cattle. On one premises alone, 70 were affected simultaneously with the two diseases and mortality generally was very high.

Age.

Whilst it is recognised that "hoose" is chiefly a disease of young cattle, usually under 12 months, nevertheless it is by no means uncommon to meet with very serious outbreaks in adult dairy cattle. McCunn described cases in adult cattle in 1935, and Roberts in a succeeding issue of *The Veterinary Record* confirmed the prevalence of husk in adult cattle and pointed out that in such cases, calves were only seldom, or slightly, affected. It may be introduced into a milking herd by the purchase of one "carrier" and the results in adults always appear to be more serious and the course of the disease more protracted than in young stock. We have knowledge of one farm, where the disease has not broken out for several years. Yet any cow purchased from this particular farm may be depended upon to spread "hoose" soon after its arrival in a new herd.

A curious feature of the disease in these outbreaks is that whilst the young stock become affected only very slightly, the dairy cows rapidly become reduced almost to skeletons, with persistent cough. However, in ordinary outbreaks of "hoose," the young cattle are more frequently affected, with only an occasional cough among the members of the dairy herd.

Climate.

In the usual way, frost is the chief factor in keeping "hoose" within bounds. In cold countries, for the perpetuation of the parasite it is essential that the supply should be maintained by adult bovine carriers, or by young animals which have resisted the mass infestation but still carry a certain number of worms.

On the advent of moist weather, provided that the temperature be not too low, larvae have a chance to develop into the infective stage, but in temperate climates, larvae may survive for considerable periods and the winter weather may never be sufficiently cold to destroy them. As a result, a mild type of "hoose" may, in certain temperate regions, be continuous throughout the year, with marked exacerbations throughout the late summer and autumn. In S.W. England, where even young cattle are seldom housed and spend the greater part of the winter outdoors, "hoose" may be persistent in a mild form. If, however, a cold spell necessitates housing, pneumonia attacks frequently supervene. When once a husking calf develops lung symptoms, the pneumonia appears to become infectious and rapidly spreads to the weaker members of the herd, often with considerable mortality. On the other hand, one or two sharp frosts about Christmas, often will cut short an outbreak of "hoose" among yearlings and when the animals are sufficiently hardy to remain outdoors the outbreak often ceases spontaneously, without any appearance of the pneumonic symptoms so common in housed cattle.

These facts indicate that *repeated* fresh infection from pasture is necessary to maintain a prolongation of the outbreak. *The life of the adult worm within the bronchi is normally comparatively short.* Mönnig states that if animals are sheltered against weather conditions and well fed, they soon lose their parasites, which do not live long in the host. This may account for many apparent successes in attempted treatment and is itself the best treatment that can be recommended.

Symptoms

In young cattle, "hoose" commences commonly in late summer or early autumn, the first indication being an occasional but characteristic cough. In mild cases, this may be heard intermittently, whilst the animals are at rest, but increases greatly in frequency if the animals are driven. Later, the cough becomes far more frequent and in a herd of any size it is rarely that one or more animals are not coughing.

The nature of the cough is characteristic. It is dry and spasmodic, resembling a "bark," and usually is accompanied by a sudden protrusion of the tongue, at the commencement of the forced expiration. Sputum may be ejected but this is more frequent during the later stages when bronchitis has become pronounced. There appears to be a natural tendency to swallow the saliva and sputum rather than expel it and this feature favours the further development of the parasite.

The nature of the cough is an aid to diagnosis and the fact that other members of the herd are coughing also is suggestive, at the commencement of the outbreak. However, care is needed here, as every outbreak of coughing among calves may *not* be due to parasitic infestation. It is important to remember that several types of pneumonia occur in young cattle, particularly when they are housed, which are the result of infection by organisms other than parasites. The cough is less spasmodic and has a moister sound. Temperature is raised at the onset, as opposed to the normal temperature of uncomplicated "hoose," and far more systemic disturbance is shown at an early stage.

In "hoose" there is, at first, little change in appetite or condition, but even in uncomplicated cases loss of condition usually commences after the first week of coughing. The disease may last for weeks or months, by which time emaciation is usually extremely marked. There is, however, a great deal of variation in different individuals, kept under similar conditions.

Dyspnoea is a common symptom but here again individual variation plays a part. It may be very marked early on in the attack and cases of suffocation may occur through massing of parasites in the larger bronchi. More often, the dyspnoeic phase passes off, though it may be a fore-runner of pneumonia. In the writer's experience symptoms of suffocation appear more frequently in adult cattle, particularly in young heifers and steers of from 15 months to two years of age. The attacks often seem to be asthmatical in nature and apart from occurring at an early stage of the disease, frequently appear in animals which subsequently show no further evidence of a heavy infestation. As soon as "hoose" becomes established, a sticky, often copious discharge, appears at the nostrils.

In unfavourable cases *the cough becomes weaker or may altogether cease*; emaciation progresses, dyspnoea becomes more severe, the animal apparently breathing through a partly opened mouth with hanging head. Appetite is lost, and the animal usually succumbs to secondary pneumonia.

Favourable cases may show very little emaciation; the cough persists for a few weeks and gradually lessens in frequency, without any change in its strength. Appetite is not impaired and the check in growth is but slight.

On the other hand, in rare instances, pneumonia may appear in several individuals, simultaneously, at a very early stage of the disease, probably coinciding with the first invasions of the bronchi by larvae. Not infrequently such cases succumb before the adult parasite can be demonstrated macroscopically. Seven deaths in yearling cattle, from primary pneumonia, ushered in an outbreak of "hoose" on one farm in the autumn of 1936. All were post-mortemed without finding adult nematodes. The remainder of the herd developed "hoose" forthwith, without any unusual severity.

Diarrhoea is not a constant feature of "hoose," but may occur when the number of larvae swallowed is sufficiently great to set up irritation. More frequently, it is caused by other parasites which thrive under similar conditions. As the worms live mainly in the small bronchi, where they suck the blood and irritate the mucosa, anaemia is a constant symptom if the infestation is at all heavy. On auscultation, the lung sounds are wheezy and characteristic of bronchitis and emphysema.

Prognosis

In young animals which have been well nourished and have had a free range in large pastures, prognosis is favourable. Some knowledge of the history of the farm is useful, as pneumonic outbreaks are more common on certain premises than on others. This applies more particularly to sick animals when housed.

In young animals which have been half-starved, prognosis is not good, particularly when they are grazed on small pastures in wet weather. Mild frost exerts a beneficial influence on the course of the disease, provided that the animals have voluntary access to an open shelter and are well fed. This applies mainly to the warmer parts of the country, such as S.W. England, where calves often live entirely out-of-doors for the greater part of the year. Young cattle affected with "hoose" may be considered to be making satisfactory progress so long as they continue to feed and are able to cough forcibly.

The nature of the cough is an aid to prognosis. A dry, explosive "bark" is more favourable than a loose cough, with an appearance of frothiness around the lips. This symptom often foreshadows pneumonia. Inability to cough or a weak, a soft or almost noiseless cough, usually indicates a fatal termination. As a general rule, the louder the coughing in the herd the better the prognosis.

Diagnosis

The eggs are never found in the faeces, but frequently may be found, together with embryos, in the sputum. No embryos can be found in the nasal mucus. Generally, it is far easier to demonstrate embryos in the faeces.

The following methods are useful:—

(1) Flotation methods, as used for egg demonstration.

(2) A small pad of faeces is arranged in the bottom of a small dish and impressions are made in it with the blunt end of a lead pencil. The impressions are filled with lukewarm water. After half an hour the water is transferred to a slide and examined under a low power or it may be mixed with sugar solution and centrifuged,

the embryos being collected from the surface with a cover-glass.

(3) By a modified Baermann technique, the faeces are arranged on a wire gauze platform, inserted in a funnel the bottom of which is fitted with a short rubber tube and a spring clamp. Clean faeces, unsoiled with earth, are arranged on the platform and warm water is trickled down the sides of the funnel until the faeces are covered. After twelve hours, numbers of larvae will have emerged from the faeces and sunk to the bottom of the filter, from which they may be withdrawn through the rubber tube and examined in a few drops of water.

Post-mortem

In calves which die of "hoose," one is often amazed at the immense numbers of worms present. Not infrequently the worms are gathered into closely-packed masses, resembling cotton-wool, and completely blocking the air passages. In a freshly dead carcase, the worms will often be dead or more or less inactive. When the infestation is very heavy, to the point of overcrowding, live worms, too, will frequently mass together, but in normal cases the living worms are disseminated more frequently throughout the bronchioles and a number can be squeezed out of the apices of the lungs, in company with a frothy, often purulent, fluid.

Patchy congestion of the lungs may exist in comparatively mild cases, whilst in fatal cases of pneumonia, associated with "hoose," the whole of the lower portions of both lungs may be solid. More often the pneumonia is localised in patches and portions of otherwise apparently sound lung tissue have collapsed. In long-standing cases, emphysema is commonly present.

Treatment

(*a*) *Prophylactic.*

Prophylactic treatment is difficult in practice, particularly on holdings where the pastures are small. Large fields considerably reduce the degree of infection. Low-lying wet ground is improved by drainage but this is often impracticable. Hill farms and the higher ground of large farms are credited with being almost free from danger, but the safest course lies in ploughing up and destroying old pastures and seeding out afresh. Harrowing old pastures, except in times of drought, is calculated to break up dung-pads and further disseminate infection; the chances of larvae being ingested are increased thereby. Some observers have recommended grazing sheep and horses over infected land with the idea of lessening the number of larvae. Liming the land and the application of kainit are useful measures, but lime is expensive and needs to be applied heavily to be of any practical use.

The drinking supply needs careful supervision. Running water is preferable to pools or drinking troughs.

When possible, newly purchased animals should be isolated. When space and facilities permit, young cattle should be separated from old and should not follow them over pasturage. The grazing intended for young stock should not be dressed with farmyard manure unless it has been well heated for a prolonged period in a big pile. Even then the outermost portions may be dangerous. Young cattle should be kept indoors until morning dews have dried off and should be in again by late afternoon. In damp weather they should remain indoors.

"Carrier" cows should be detected and removed from the herd. Usually they are numerous and this precaution becomes impracticable. Chronic "coughers" should be eliminated.

(*b*) *Curative.*

At present there is no specific curative treatment. *So far the value of all treatments calculated to destroy lung worms has lain in their inefficiency.* With the possible exception of ol. chenopodii, and solutions of pyrethrum in oil, none of the intratracheal injections in common use has any marked effect on the vitality of worms situated in the smaller bronchioles. This is particularly fortunate, for, in practice, unless the infestation is very slight, live worms in the lungs are infinitely to be preferred to dead worms. As previously stated, live worms are usually active, moving worms, constantly changing their positions. Partially destroyed and outnumbered, overcrowded worms gather into masses. Masses of dead or inactive worms cause asphyxia or death, particularly in animals which are losing or have lost the power to cough. Dead, decomposing worms, apart from their asphyxiating effect, favour the development of secondary pneumonia.

Ol. chenopodii will kill, in quite moderate dosage, all lung-worms with which it may come into contact. It will also kill, roughly, 100 per cent. of the calves "successfully" treated. In one outbreak in the writer's practice, eight calves were treated for "hoose"—a heavy infestation. Four received a simple intratracheal injection containing carbolic acid, chloroform and turpentine in oil. The other four received the same treatment but the turpentine was replaced by ol. chenopodii, m. 4, and the oily base was proportionately increased to give the equivalent bulk. After twelve hours, the four receiving chenopodium were all dead of asphyxia, the other four remaining as previously. *Post-mortem* examination was conducted immediately after each death. The bronchi were choked with masses of *dead* worms, resembling tufts of cotton wool. The other four calves all recovered.

The most that a harmless, intratracheal injection can accomplish is to increase coughing in animals still capable of increased expulsive efforts. Some of the worms in the trachea and larger bronchioles may be removed. Any injection, known to be harmless, may have some slight beneficial action in early outbreaks presenting only a mild infestation; otherwise this method of treatment is calculated to do harm.

A prescription, used by the writer in early, mild outbreaks, with no harmful results and often with no useful effect, is as follows :—

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Acid carbol. liq. -	half an ounce.
Chloroformi meth. -	one and a half ounces.
Ol. tereb. - -	three ounces.
Ol. olivae - -	three ounces.

M. Ft. Inj.

Dose :–Under twelve months, one drachm; over twelve months, two drachms. Repeat in one week.

An injection containing 5 milligrammes per c.c. of pyrethrum in solution in oil, in 5 c.c. doses, is stated to give good results, whilst Russian workers recommend intratracheal injections of iodine. The warning given above as to the danger of intratracheal injection in heavy or advanced infestations, applies to these agents also.

Therapeutic treatment should be directed towards maintaining the animal's strength and *ability to cough* and to minimising the chances of fresh infection. This can be done by housing, but in animals used to an outdoor existence the liability to pneumonia is increased.

An attempt should be made to destroy larvae in the bowel. Ferri sulph. and cupri sulph., given in the food daily, may assist but mainly they are useful in maintaining the haemoglobin content of the blood. Electuaries, containing camphor and Stockholm or Burgundy tar, rubbed down with treacle and thickened with pulv. glycyrrh. are useful as expectorants. Daily dosing with creosote and small doses of turpentine in linseed oil (2–4 oz.) is calculated to reduce subsequent reinfection from larvae passed in the faeces.

A suitable prescription is the following, which, despite the fact that it dates back many generations, is none the less useful :—

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Ol. tereb. - -	three ounces.
Asafoetidae - -	six drachms.
Chloroformi - -	six drachms.
Creosoti - -	two drachms.
Aqua calcis - -	six ounces.
Ol. lini *ad* - -	one and a half pints.

M. Ft. Mist.

Dose :–One to two wineglassfuls, twice daily, in gruel, to each calf.

Arsenic and arsenical preparations apparently have no effect. In one instance, in the writer's practice, animals dying from prolonged exposure to arsenical fumes from a calcining plant, still harboured numerous living worms in the lungs. Although the concentration of arsenious oxide on the herbage was sufficiently heavy to render the grazing dangerous to life for the cattle, nevertheless the ground remained infective to fresh cattle introduced.

In advanced cases and in those showing signs of asphyxia, we have obtained the best results from the injection, subcutaneously, over the ribs of each side, of camphorated oil, 30 c.c. The skin is massaged to distribute the injection over as large an area as possible. The injection is repeated every second or third day.

In animals exhibiting symptoms of approaching asphyxia, we inject 2 c.c. of adrenalin, 1 : 1,000, into the jugular vein, in addition.

Inhalation treatments, such as the iodine and hot brick method, have in our opinion, little to recommend them. They are certainly harmful in advanced cases: usually lungworms have greater resistance than their hosts. The detection and elimination of co-existing parasites is advisable. Calves may harbour, at the same time, liver flukes, gastro-enteric strongyles and lung worms, of which the last may be the least dangerous to the animal's existence. Appropriate therapeutic treatment for parasites should always eliminate any possibility of the remedy being worse than the disease.

Bibliography

Mönnig, H. O. "Veterinary Helminthology and Entomology."

Cameron, Thos. W. M. "The Internal Parasites of Domesticated Animals."

McCunn (1935.) *Vet. Rec.* page 940.

Roberts (1935.) *Vet. Rec.* page 970.

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Mr. J. F. D. Tutt, F.R.C.V.S. (Winchester), President of the Veterinary Medicine and Surgery Section, was in the Chair when this Section met in the Town Hall, Bournemouth, at 10 a.m. on Friday, July 30th, 1937, for the purpose of discussing the foregoing paper.

The Chairman immediately called upon Mr. Smythe to introduce his paper.

Mr. Smythe said: When first I was invited by this Association to present a paper on the clinical aspects of hoose in cattle, I was naturally pleased and I appreciated the compliment. Later, when I started to put pen to paper, I realised suddenly that, after 28 years of practice in an area where hoose was superprevalent, I still knew very little about it and that the sum total of my transferable knowledge of any particular value to the profession would not exceed ten lines of type. Of course, that placed me rather in a quandary, so I was forced to emulate the best essayists and look up the

existing literature. The next fact that became clear was that, with the exception of a few well worn statements in text books and one or two clinical articles, nobody else seemed to have managed even ten lines and there was not any literature to draw upon. The result was that I was forced to write down just what I had seen in practice so that the paper, like the female dictyocaulus, is now characterised more by its length than its virtue. Veterinary surgeons live strenuous lives. Before the Conference they are short of time and during the Conference they have no time at all, so possibly some of you have not read the paper. I will, therefore, with your permission outline the main points discussed. First, though, let me add that I have no grievance against the procedure of the N.V.M.A. The Association decides on a paper, then invites a member to read it. I have no complaint regarding their selection in this case but I am fully conscious that in my audience are others who could have made a better job of it, and many could have commenced on fifteen lines against my ten. (Laughter.) So that I am starting at a disadvantage.

The main points are as follows:—

(1) Lack of good feeding and housing during the first few months of life are the greatest factors in lowering resistance to parasitic invasion.

(2) Live worms in the air passages are infinitely preferable to dead worms, which form tight clusters, leading to asphyxia or pneumonia.

(3) So far, the value of all treatments calculated to destroy lung worms has lain in their inefficiency. When intratracheal injections have the power to kill lung worms the life of the host is in grave danger.

(4) The paper offers nothing original in the way of specific treatment. It favours housing when possible, good hygiene and good feeding from birth onwards and the avoidance so far as possible of infestation. It ends with the final piece of advice, "Appropriate therapeutic treatment for parasites should always eliminate any possibility of the remedy being worse than the disease."

With those few remarks I will leave you to carry on the discussion and I feel sure that Captain Gunning, to whom I wish to express my gratitude for opening the discussion, will make up for the deficiencies in my own effort.

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Discussion

Captain O. V. Gunning, D.V.M., M.R.C.V.S. (Tutbury), the opener of the discussion, said:—

Those of you who had the good fortune to listen to Mr. R. H. Smythe's paper on bovine emaciation at Bristol in February, 1935, will endorse the action of the Provisional Committee in selecting the same author to present a paper, at this Congress, on "The Clinical Aspects and Treatment of Hoose (Parasitic) and Allied Conditions in Cattle." For my own part I frankly admit I expected a worthy contribution from Mr. Smythe on this subject and I am sure you will agree with me that we have not been disappointed.

Mr. Smythe has dealt with a very difficult subject in a thorough and concise manner and it seems to me he has left very little unsaid that should be said. This is not altogether advantageous to the opener of the discussion who is expected to add to and enlarge on the points that have been raised.

After describing the life-history of the parasite Mr. Smythe divides his paper into four main heads: i, Infection; ii, Factors Influencing Resistance; iii, Symptoms; iv, Treatment. He also briefly mentions Prognoses, Diagnoses and *Post-mortem*, and Treatment he divides into Prophylactic and Curative.

Under Infection, Mr. Smythe stresses the point that low-lying and undrained meadows and marshy ground are notorious for the prevalence of hoose and other parasites. He also adds that on over-crowded and small meadows the growth may be no more than a nibble and that cattle feeding close to the ground on infected land may develop infection at almost any time.

This is in agreement with my own experience, for in my district much of the land is not unduly marshy or low-lying, yet hoose will appear early in July and we have already been consulted on several outbreaks. It is not altogether my experience that the disease is confined to wet weather, as we frequently get an epidemic of hoose during a dry summer. I attribute this to the heavy dews and close cropping referred to by Mr. Smythe, though if it is true (as Mr. Smythe states) that bright sunshine and drought retard the activities of the larvae, it is difficult to understand why outbreaks should occur in dry weather at all and I should welcome his observations on this point.

I agree with the essayist that conditions favouring the lung worm are also favourable for the development of other parasites and a sample of faeces I examined last week from calves my assistant had injected for hoose, showed considerable numbers of strongyle eggs. I also agree with Mr. Smythe that hay appears to be a source of infection and outbreaks occur in calves that have never been at pasture at all. However, in this respect it must not be confused with a condition seen in calves housed in badly ventilated sheds and which are compelled to stand on a heavy covering of dung. In certain instances the fumes arising from the dung, probably in combination with the ill-ventilation, cause lung complications in calves associated

with coughing. At the same time, I am sure there is no doubt that calves develop hoose from hay. At one farm I attend, if after a wet summer calves are fed hay from certain low-lying meadows on the farm, they invariably develop the condition. My client, who is an unusually intelligent farmer, assures me that if in the early stages the hay is substituted by Highland clover hay (which the calves do not relish nearly as much) the disorder will disappear.

Mr. Smythe deals with permanent pasture as a common source of infection and in my experience of controlling hoose this is the most difficult obstacle we have to combat. In my own district and in many others in England, there is an inherited custom to retain the small paddocks close to the homestead for the rearing of calves. The same paddocks are used year after year and remain a hotbed of infection, whereby the parasite is nursed and propagated as each season succeeds the next.

Apart from actual infection, I feel the question of pasturage is an important one. Is it not a fact that on many good farms all the stock with the exception of the young calves do well? On these farms the land is either calf-sick or is, as it is called, " too strong," or has too narrow a protein ratio. To instance this point, I have in my practice this summer one bunch of calves at pasture on a good farm being fed in addition a good growing ration of crushed oats and bran and a little compound cake. In other words, a ration which one would expect to be ideally balanced and yet the calves are not doing as well as two other lots at ley on rough park land which are receiving no addition of concentrates. It, therefore, seems possible that calves in many instances would be far better able to withstand infection if transferred to a more suitable pasture.

While dealing with growth I should like to say a word about economic loss. Not long ago I was asked to pick out two yearlings which had suffered badly from hoose last autumn but had recovered. I was requested to select them from a bunch of calves which were twelve months younger. It was a revelation to me to see that except that these calves had a stronger growth of tail and horn, it was impossible to pick out the older animals!

The clinician is most concerned with the treatment of hoose and I have personally read this part of Mr. Smythe's paper with great interest. In his opening remarks on this section he says that prophylactic treatment is difficult to practise and as I have remarked earlier in my discussion, this is in my experience the most difficult obstacle the veterinary practitioner has to combat—for the simple reason that our recommendations have always to be adapted to practical farming routine.

With regard to actual treatment: if a little sorry, I was not surprised that Mr. Smythe has little new to offer us. It is a surprising fact that the standard treatment of 40 years ago practically remains the standard treatment today. The essayist states that, so far, the value of all treatments calculated to destroy lung worms has lain in their inefficiency. Parasitologists even go farther and tell us that intratracheal injections are useless.

I must say that I, like the essayist, have always held an open mind as to just how much good intratracheal injections do. I well remember in my early experience with hoose in sheep, taking a lamb carcase to the late Professor Cave, who had done a great deal of research into sheep diseases. He made a smear from the lobe of the lung far removed from the trachea, which showed scores of lung worm ova. It seems certain that small injections cannot reach these ova. In spite of this, intratracheal injections continue to play an important part in controlling or the attempt to control outbreaks of parasitic lung trouble and the remarkable part is that our clients are frequently quite satisfied with the results; certainly there are always those unexplainable cases cropping up where we inject a calf *in extremis* and we learn, some weeks or months after, that after the injection this particular calf made an uninterrupted recovery.

As to results, I should like to say that I seemed to have better success with my intratracheal injections on lambs than I had with calves.

In the autumn of 1922, following the memorably dry summer of 1921, in my practice in Kent there was a severe outbreak of parasitic hoose in lambs and for three weeks, Sunday and weekday, I did practically nothing else but inject lambs intratracheally: I made about 1,000 injections and the results seemed to be very satisfactory. I have particular recollections of going to one farm. The first three lambs I injected lay stretched out on the ground following the injection. I was seriously alarmed and told the owner I thought the outbreak was too far advanced and that it was unwise to continue the injections. The owner replied that I could not make it any worse as he had to bring out a cart every morning to pick up the dead lambs and he was willing to take full responsibility. With this assurance I injected the flock which was a fairly large one. We had two assistants getting them on their feet and staying with them until they started coughing well: when coughing starts the lamb will not suffocate. After the injections the owner only lost one lamb. I should much like to know how you would explain this spectacular recovery.

As I moved from the district I did not have the opportunity to pursue my work with lambs. The formula I used for the lamb injection was

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recommended to me by Major Dunkin. It is detailed in "Diseases of Cattle, Sheep and Goats" (Mohler) and consists of Dieckerhoff's iodine with ol. tereb., equal quantities, made into an emulsion with olive oil. Mr. Smythe's control experiment with ol. chenopodium is very interesting and it is deplorable that we have not more similar experiments to guide us.

With regard to calves, I, like Mr. Smythe, like to use something that at least is harmless. I have tried most things: turpentine with oil; turpentine without oil; I used Dieckerhoff's iodine for some time; I now pin my faith on paraform et allyl (Willows). This contains 0·1 per cent. allyl sulphide and 2 per cent. paraformaldehyde. I like this because I have found it non-irritant. Last summer I had the opportunity to try it on two calves suffering from severe parasitic pneumonia. These calves tolerated two weekly injections of this formula and actually improved on it. One finally died, but only after the injections had been discontinued.

I should like to ask the essayist if he has tried inserting a trachea tube in the advanced lung cases. Mr. Eaton, of Hallaton, claims good success with this treatment, giving the injections by the tube. In a limited number of advanced cases my experience was not so good but I consider it a line of treatment well worth following up.

I fully agree with the author that intratracheal injections should always be combined with drenching to remove the stomach worms and if the calves are weakly. I should not fast them beforehand.

There is one thing I feel certain about and that is that treatment is of no value unless you can prevent reinfestation. If the condition starts, place the calves on a new field where horned stock has not been for six months. I think there is a good deal of truth in the statement, as long as there are no neighbours' bulls about have the calves as far away from the homestead as you can get them.

With regard to prophylaxis, I feel I can do no better than describe the method of a client of mine who has a hoose-infested farm. His method is to turn the calves out in May, at about three months old. He keeps them out just long enough for them to find the floor. As soon as they have learnt to graze they are housed again until after a good frost in November, when they are turned out for the winter and trough fed. This is the best method of prophylaxis I know. Calves that have not learnt to graze will stand under the hedge and starve if turned out in November, and calves which will not fill their belly go to the water trough—calves must not be turned out too young or too early. If calves are out and begin to "hoose," have them in immediately—a week's neglect will make or mar recovery. If a calf with parasitic lung affection refuses to cough it must immediately be put back on the pail.

We seem to have made little progress with regard to hoose, yet may it not be a fact that, as in so many other conditions, while straining for some new specific treatment we pay too little attention to the few simple essentials of prophylaxis which are of the utmost value?

In conclusion, I should like to apologise for the scrappy nature of my notes, and again to congratulate Mr. Smythe on a very good paper.

. . . . .

Mr. F. T. Harvey (St. Columb) said that the paper was in a way rather depressing. It seemed really to be an account of hoose as met with in an area where over-stocking and under-nutrition were common disease-producing factors amongst the young cattle, factors which usually associated themselves with a high mortality, not only in hoose, but in other diseases. Hoose plus emaciation presented a problem for the practitioner, but under ordinary farming conditions the disease was by no means so unresponsive to treatment as Mr. Smythe would have them believe. The complications of hoose were responsible for most of the mortality and the worst complication they could have to contend with was under-nutrition or bad husbandry. If Mr. Smythe had qualified his Shaw-like postulates in regard to the inefficiency of any form of treatment of hoose by adding "in the presence of under-nutrition," one might be inclined to agree with him.

There was a complication of hoose which was rather common and might be met with in cattle or in calves reared on milk direct from the cow ("busted" calves); in fact, in animals in quite good condition. There might be a mild infestation with lung worms, but not much cough or loss of condition—nothing, indeed, to alarm the owner unduly. The flock appeared as usual on inspection, but a few hours later a beast might be found struggling for breath and in a day or two would probably be dead; in a few days perhaps another would go down in the same way. Here a strong vigorous cough had probably ruptured some damaged lung tissue, air escaped into the inter-lobular spaces and quickly permeated the whole lung, or lungs. There was a great increase of inter-lobular pressure and pulmonary oedema ensued with overloading of the right heart. Death resulted from asphyxia or anoxaemia. When the lungs and heart in such a case were taken out at *post-mortem* the increase of volume compared with the normal was astonishing and one wondered how such a mass could have been held in the thorax.

This severe degree of interstitial emphysema occurring in cattle affected with parasitic hoose had interested him for many years. The bovine lung differed very materially from the lungs of most other animals and these differences might have an important bearing on the course and terminations of parasitic bronchitis, and perhaps some other lung diseases—such as the tendency to dry pleurisy rather than the moist or plastic types, and the not-infrequent outbreaks of what appeared to be infectious pneumonia complicating hoose, or occurring independently of it, as seen in both young and older cattle. A small area of lung involved in a parasitic lobular

pneumonia might originate a fatal interstitial emphysema. Those windy lungs he had seen only in bovines and, strangely enough, a subcutaneous emphysema rarely or never accompanied the condition, in hoose at least. A very interesting account of "The Normal Anatomy of the Bovine Lung" appeared in the *Journal of the Royal Agricultural Society* for 1878, Vol. 14, pp. 169, by Gerald F. Yeo, Professor of Physiology, in King's College. The large amount of interlobular tissue, the branching of the bronchi, the arrangement of the lobules, and the lymph circulation, especially the subpleural, all offered special features in cattle, according to Yeo.

Mr. Hugh Begg (Lanark) congratulated Mr. Smythe on his paper which, he said, very evidently bore the stamp of keen observation and good literary merit.

He (the speaker) agreed with all Mr. Smythe had said under the heading of "infection." They would notice that Mr. Smythe very properly stressed the truth that pools and drinking troughs might be polluted with larvae as simply as the surface of the land and were prime factors in the spread of infection. In this connection a passing thought recalled by comparison the efficiency of the raised trough as a prophylactic measure against diseases in which the infection emanated from the posterior of the body, *e.g.*, Johne's disease and contagious abortion.

It was important to remember, as Mr. Smythe had said, that uncomplicated hoose was not a febrile condition and that the stronger and more snappy the barking cough or "hoosing" of the calf the better was the prognosis.

He himself had had very little experience of hoose in animals over 18 months old but he could remember some years ago being nicely tripped into the condemnation, under the Tuberculosis Order, of a recently calved and persistently coughing four-year-old Ayrshire cow whose lungs were so musical that he never dreamt of being caught out. The *post-mortem* revealed his blunder—it was a case of "hoose" but she was an accommodating creature and he escaped on tuberculous mesenteric glands which he had not diagnosed.

Mr. Smythe very properly advised keeping the young stock off the grass while it was wet with dew or rain if they would avoid hoose, but he did not go so far as some did in the County of Lanark who had valuable Ayrshires and who, through experiencing losses from the diseases of calfhood, habitually kept them indoors until they passed the twelfth or thirteenth month, when they were in good condition and resistant. It cost more, but the expense was regarded as justifiable. All who understood the hoose problem agreed that a virile condition of body was the best safeguard, and this was true of other infections.

Like Mr. Smythe, they were increasingly sceptical of all kinds of curative treatment beyond the use of haematinics or such drugs, given *per os*, as were calculated to destroy the larvae of *Dictyocaulus* and other gastro-intestinal parasites that could prejudice the well-being of young stock.

Having stated that there was no specific treatment for hoose and made use of the somewhat paradoxical statement that "so far the value of all treatment calculated to destroy lung worms has lain in their inefficiency—which was easily the most significant sentence in his paper—one wondered why the essayist had displayed recipes for the quality of treatment he so magnificently condemned on the basis of his clinical experience. If he had "given them all the go-by" as a means of emphasising his contention he would definitely have marked a new era in the control and treatment of the disease, even supposing he had evoked rank opposition. Unorthodoxy in veterinary matters, as in religion, demanded courage, but when received opinion and routine practice could be proved false by a clear-sighted observer he should deal a lethal stroke, and because he (the speaker) thought he was right in that italicised sentence he would be consistent and refrain from discussing all futile treatment the use of which only increased the stock-owner's loss.

Captain J. R. Barker (Hereford) said he did not know whether his religion was orthodox or unorthodox but he was a cheerful optimist and he thought the paper was rather depressing. Several factors which were not mentioned in the paper very clearly had a very great influence in the control of parasitic hoose in cattle, either in young or old cattle, and he was rather astonished to find there was no mention of immunity which was gathered when calves were infested early in their life and when they grew up seemed to be free from any attack of parasitic hoose—at least free from symptoms. He would like to ask the essayist to enlarge upon that subject because it had a very great bearing on the incidence of the disease in older cattle. When they came to the question of older cattle coughing in August the differential diagnosis was not so easily made, particularly because there were other diseases—especially in his district, he found oedema of the lungs, and if a careful diagnosis was not made the two diseases could be confused.

Referring to the question of nutrition, Captain Barker said some of the speakers stated that if they turned the young cattle on to grass and left them alone they did better than those artificially fed in addition to grass. Grass was a variable quantity throughout the year and, contrary to what people might imagine, grass was at its worst in late June and July. He had found, both in lambs and in calves, that it was necessary to supplement the very poor grass in late June, July and August, with a feeding mixture of bran, crushed oats and hay chaff, and particularly with an addition of a mineral mixture. One that was easily made was slaked lime, wood-ashes and a handful of ordinary, common salt. A farmer responded to that because he had the materials available on the farm and would readily add that. At that time of the year both the extra protein and the extra mineral were required, and he had found the best way to prevent or to influence the outbreaks of hoose in cattle, sheep or lambs was to supplement the feeding in those particular months.

He wished to refer also to differential diagnosis in cattle. Not all of them, he was sorry to say, took smears for the examination of worm eggs in every outbreak of hoose or in every animal treated with intratracheal injections. Where that was done it was essential to eliminate the *Corynebacterium* and also the *Micrococcus catarrhalis*. In some cases where intratracheal injection had failed vaccination with vaccine composed of *Corynebacterium* and *Micrococcus catarrhalis* brought about speedy and effective recovery. He was not quite so pessimistic as the speakers, the opener and those succeeding him, about the treatment. He had found that tetrachlorethylene was a very useful adjunct to give in capsules to destroy those particular parasites in the alimentary tract. He felt quite a lot could be done to help the farmer

who had any particular animals, young or old, coughing and that much could be accomplished by prophylaxis.

Mr. N. S. Barron (Reading) said that Captain Barker had raised the question of the immunity aspect of hoose, on which he wished to make some remarks. It was generally agreed that there was some age immunity in connection with hoose, but one must also consider the possibility of animals, when they had reached a certain age, not having been in contact with infection in their early life, and from his own personal experience he felt that age immunity was not an immunity which was in itself adequate. If young stock were exposed to what they might call a sub-lethal dose, or at any rate where the effect was not sufficient to produce symptoms, the immunity was likely to be much longer than that given by increase of age alone. He knew of a certain breeder of Jerseys who purchased a considerable number of Jersey cows from the island, brought them over to this country and put them on his farm where he already had quite a number of calves. These animals were four years old and just in their second calving. Within a very short time he had a very bad outbreak of hoose and, out of the 30 milch cows, three died and a total of 15 were badly affected.

A further point was what advice to give as to the treatment of pastures. He would like to bring to their notice a chemical called calcium cyanamide which seemed to have a little more effect against larvae. Experiments had not gone very far forward but, nevertheless, at the present stage it seemed a thing worth while considering when something had to be recommended.

Mr. P. Wilson sympathised with the writer of the paper in having such a difficult subject on which to give the conference anything fresh. He agreed with the opener of the discussion that there was very little difference in present day treatment compared to 30 or 40 years ago. With regard to prophylactic measures, he thought the best line of treatment, where one had the facilities of those small paddocks in which the calves were reared, was to top-dress with salt. For four of five years on one farm he had had to treat calves with hoose in a small paddock of about two-and-a-half acres where they always lost 20 to 50 per cent. of the calves each year from hoose. The owner then dressed this land with about a ton or 25 cwt. of salt per acre. He killed all the grass, but since that time, he (the speaker) had never had to go to that farm to treat hoose. So where that could be done in a small paddock he thought it was one of the best preventatives. But another line of treatment he liked to adopt was to give a good dose of opening medicine, aloes and jalap, and to follow on with expectorant treatment. He got more satisfaction with that treatment than he did in treating with intratracheal injections. About 30 years ago, he heard the subject of hoose discussed at the old Clyde Street College at one of their old Friday night meetings and he could remember the professor, closing the discussion, said: "What remarkable cures we have made of hoose. Gentlemen, you have not cured them, they have got better." He (the speaker) thought the same thing could be applied to-day.

Mr. R. Turnbull (Lewes) said he was with Mr. Barron, who had raised the question of Jerseys, a subject which he was rather surprised to see had not been mentioned once in the paper. Of recent years he had had considerable experience of Jerseys. He believed he was right in saying the Island of Jersey was free from hoose infection, yet when the cows were imported they went down to the disease like flies. The peculiar aspect of the thing was that they showed symptoms of hoose in from two to three weeks of the time they were imported. The disease was evidently set up in those cases by larvae. He had seen animals die of the disease within a month of being imported. After they had been in the country a year they seemed to develop quite a marked immunity. If Mr. Barron would like to carry out any research he could arrange for him 30 patients to work upon. He had to deal with a matter of probably two or three hundred of those animals coming in every year.

In regard to treatment, he had tried more or less everything and the important drawback with those imported animals was that they almost invariably developed secondary pneumonia. He had had as many as ten of those animals die in one week on one farm. They cost £30 to £35 each and that constituted rather a heavy loss to the owner. He emphasised that there was a very wide field for investigation into the treatment of the disease.

Mr. A. R. Smythe (Falmouth) observed that it was an accepted axiom that, in parasitic infestation, the degree of infection determined the course of the disease. So it was with hoose. In the case of a mild infestation the animal recovered but in a severe infestation, in spite of all treatment, the animal often succumbed.

In regard to intratracheal injections, it appeared to him that in young stock benefit often resulted. When, however, the treatment of adult cattle arose the question was an entirely different one. One could use intratracheal injections or any other method of treatment desired, but it would be found that in bad outbreaks some 30 to 40 per cent of the animals would die.

The Reply

Mr. R. H. Smythe, replying to the discussion, said that in the first place, he must express his very sincere thanks to Captain Gunning for his very instructive opening and also to all those who took part in the discussion.

Captain Gunning had asked why outbreaks occurred in dry weather. He was to be congratulated on his geographical position. In Cornwall, it was so seldom anything else but wet. Let him hasten, however, to remove any slur upon the Cornish Riviera: what he should have said was that owing to the natural humidity of the Cornish climate, there was always a heavy dew on the grass in the morning, even in the hottest weather and that was probably sufficient. Without this minimum of moisture, he should consider it almost impossible for the life-cycle of the parasite to be completed. He was glad that Captain Gunning had pointed out that better results were obtained with upland hay: it backed up his own theory that hay was a great factor in distributing infestation, although many observers would not accept the possibility.

He quite agreed that injections could not reach parasites and ova in the small bronchioles. In his opinion this was a cause for congratulation. It was also a possibility that the bad cases mentioned by Captain Gunning might have recovered without injection; in fact, it might have been in spite of treatment. He congratulated him on finding one proprietary preparation which did no harm.

Mr. Harvey had suggested that the cattle in his (the speaker's) district were suffering from deficiency disease. Well, they were not far apart and he had only to look over the hedge to

see some of Mr. Harvey's patients. He must admit, though, that more of his survived, so perhaps his explanation might be correct. His area certainly was badly overcrowded. He was interested in Mr. Harvey's description of ruptured air sacs and interstitial emphysema and had observed the same thing on *post-mortem*. He believed, however, that quite a lot of the almost sudden deaths were due to spasm of the bronchioles, of nervous origin, set up by local irritation from larval penetration, particularly in early cases showing asphyxia. This was accompanied by failure of the right heart. Some of those cases recovered and were almost normal in a day or two, which ruled out pneumonia as the lesion responsible.

Mr. Begg had suggested raised troughs, but he had seen no great advantage; in fact, one of the worst outbreaks in dairy cows, last year, was traced to such a trough. Mr. Begg deplored his lack of moral courage and stated that he, personally, would not have suggested a line of treatment in which he had no belief. Neither would he have done, but for the fact that he had a more intimate knowledge of the requirements of clients and the shortcomings of the veterinary profession. Whatever he omitted, clients would insist on treatment and veterinary surgeons would insist on administering it and he realised that if he told them *they* might do something which *he* knew would not do any harm, both parties would be satisfied and the patients would not suffer.

Then came Captain Barker—"the cheerful optimist." It was a blessing to find an optimist nowadays in the profession and he welcomed him, even if he did not always agree with him. He found his paper depressing. Might he point out that pessimists were of two kinds: those who were pessimists because they were too tired to be anything else and those who were pessimists because they could find little or no cause for optimism. He (the speaker) belonged to the latter group, in this particular instance. He believed that there was a nutritional advantage in feeding mineral mixtures in some circumstances and he agreed with Captain Barker that theoretically the use of vaccines, if prepared by a bacteriologist and properly controlled, might be a useful line of treatment, for he considered that secondary invasion was one of the dangers; but he should want to know something about the secondary invaders and the vaccine before he would have much confidence in it as a routine treatment.

Mr. Barron raised the question of an acquired early immunity. Personally, he had a very open mind on the subject of immunity to parasites. He realised that an age immunity might develop to some parasites but it was then only comparative and liable to breakdown at any time, as in the case of aged dairy cattle developing hoose. In any case, the same cattle sometimes become infested for several years in succession, commencing as calves, so that there was little evidence of an acquired immunity there. He was particularly interested in the use of calcium cyanamide in place of lime and should it prove to be of value, he hoped that the same privilege would be extended to purchasers as in the case of lime.

Mr. P. Wilson had suggested as a top-dressing, 20 to 25 cwt. of salt to the acre. He stated that it burned off all the grass. He was wondering if the salt did good *per se* or whether it had the virtue of destroying all the step ladders by which the larvae would have crawled upwards to a brighter world.

Mr. Turnbull had given them an interesting account of imported Jerseys, "going down like flies." He (Mr. Smythe) expected that this corresponded with the cases he referred to of Guernseys on a previously free farm, which died during the primary larval infestation, before the adults had time to put in an appearance. He considered that death in those cases was due to secondary invaders, normally present in the lung, becoming active or in other cases to bronchial spasm from irritation.

Mr. A. R. Smythe had made reference to the good results of intratracheal injections in young cattle. He believed a good many of those remarkable recoveries were not wholly due to injection. Whilst something had to be done for the good of the ledger, one must have some regard for one's soul!

The Combating of Animal Diseases and the Improvement of Stock in Empire Countries*

JOHN SMITH

(Member of the Agricultural Research Council and of the Colonial Advisory Council of Agriculture and Animal Health: formerly Head of the Departments of Agriculture and Animal Health, Northern Rhodesia.)

Part I.—The Combating of Animal Diseases

Introduction

It will be realised that the scope of this article is so wide that it will not be possible fully to discuss the type of work which is being carried out in all parts. The subject can only be treated on general lines. Furthermore, the history of the cattle industry in our dominions has already been told in such detail that no attempt has been made to deal with it.

Before discussing the problems which must be confronted, it is necessary briefly to consider the position which cattle have held, and, to a considerable extent, still hold, in parts of the Empire. In Africa, for example, they have always occupied a very important place in the general life of the African. They have always had, and still have, much more than an economic value. They have a high sentimental value and determine, to no little extent, the owners' standing in the social sphere and in the tribal influence. It must be granted that a change is becoming obvious in some parts, but it will be many years before the old prejudices give way to the changes of progress. Number is still the principal factor: the importance of

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quality has not been realised. Even if the animals are of the most indifferent type, a large herd denotes an important owner. Accompanying this outlook is an ingrained prejudice against interference with practices which are deeply rooted in the history of the peoples. A further difficulty arises in that, although his cattle are a source of such pride to the African, he is an exceptionally bad stockmaster. The care of the herds is left to the boys of the village. Animals are penned during the night in kraals of very limited size. They are rarely changed, nor is the dung removed: and during the rainy season they become quagmires in which the animals stand belly-deep in mud. Their release in the mornings depends largely upon the temperature at which the boys will leave their blankets and huts. The choice of grazing grounds is settled by custom or by the presence of shady trees under which the herds can rest during the heat of the day. Young calves are penned during almost the whole of their early life, without covering against sun or storm, and only allowed access to their mothers for limited periods, morning and evening. Consequently, they soon realise that they must obtain maximum sustenance in a minimum period, so that digestive and other troubles follow. This mixture of pride in his stock, and apparent indifference to their welfare, is one of the most surprising and difficult traits of the African cattle-owner.

In some of our more eastern colonies, cattle, and the domestic buffalo (which must be considered as part of the cattle industry), are still treated with indifference or neglect, but they occupy a dual position in the life of the indigenous community. Not only are they a source of food supplies and used as draught animals for all purposes, but they are a part of religious observances and ceremonies. The problems of disease control and improvement of quality are thus rendered extremely difficult. Any interference, even when undertaken with the highest motives, with practices rooted in mysticism, becomes fraught with grave danger. In some of our colonies the smaller stock are of little potential value, in others they are of greater importance than cattle. The improvement of sheep to a standard necessary to compete in the world's markets, either as mutton or wool, will have to be a gradual process. With goats, however, the position is somewhat different. The value of their pelts, even as the animals are to-day, has been recognised, and control of skin diseases, with advice on the treatment of skins for the market, is being actively carried on with most encouraging financial results. The pig still occupies a low place in the estimate of owners in those parts where he is found, and often lives in a semi-wild and insanitary manner.

Although the essentials of disease suppression and stock improvement are applicable under all conditions, the manner in which they can be carried out differs according to the state of the inhabitants, the accessibility of herds, the presence or absence of local demand, and so on. The problem is not limited to the stock of the indigenous owner. The presence of progressive Europeans has a distinct and highly important bearing upon it. The emigration of Europeans to our colonies has extended in some cases over a very considerable period: in others, the occupation of land not reserved for the local inhabitants has but recently begun. Indeed, there are still large tracts awaiting settlement. The first immigration has usually been associated with intentions other than agricultural. Excluding missionary endeavour, which will be referred to later, and military operations, the trader has usually been the first on the scene and has, in the course of time, been responsible for a limited and localised demand for agricultural produce. This demand, increasing according to settlement, has been met, or partly met, in an extremely haphazard manner, no attempt having been made to arrange for continuous supplies or adequate amounts. Only when demands have become large and insistent, has any attempt at organisation been made, and, in those colonies where the natives are backward this has almost always been controlled by immigrants. The demands have, of course, differed in their nature in varying colonies and have even changed, as time went on, in the same territory. The necessities of life still remain the problem in some parts, working animals for draught and cultivation in others. In some colonies, where the outlook was considered to be purely agricultural, incredibly rapid industrialisation, due to mining and similar ventures, has resulted in demands quite beyond local resources. In these the problem has been further complicated by the demand, during the development stage, for labour at wages which have tempted both Europeans and local inhabitants from their ordinary pursuits. Thus, when real endeavour was essential, many of those who should have taken part in agricultural advancement have been otherwise engaged. The stimulus for progress is demand. In many of our colonies this demand, other than the limited local one, is entirely absent: even if it should suddenly develop, as in the case quoted above, the condition of the animal industry usually precludes the benefits being reaped. The fruition of disease control and stock improvement can only come after many years of strenuous and continuous effort. Both entail the expenditure of public funds, and, in most colonies, only the most limited amounts can be spared. Naturally, claims upon such funds as are available are

made in respect of all manner of work, and that which appears to benefit the community in the shortest time must always receive favourable consideration. Apart from the dominions and Southern Rhodesia, there is no part of the Empire from which there is an export of stock or produce (with the exception of hides and skins) which has any economical effect upon home or world markets. In few can it be said that the quality of the stock is such that the time can be accurately estimated when suitable animals, in large numbers and with continuity of export, will be able to compete with those already in possession of markets. The necessity, therefore, for pressing on with the work is, in some minds, entirely absent. Many will argue that it is foolish to commence, or continue, progressive effort. The only potential market, they say, is the home one and this is becoming increasingly embarrassed, day by day, from Empire sources and foreign competition. "Why should public funds be expended on an objective which is of questionable potential value?" "Let the European settlers improve their stock, at their own expense, if they desire to do so, but let us not raise up herds of improved stock for which a means of disposal cannot be found." Such a view entirely loses sight of conditions that are dangerous to overlook.

Let us again take the colonies in Africa, including portions of the Union of South Africa, as an example. It will hardly be denied that the first step in cattle progress is the suppression of disease. That work has been carried on for some time with varying, but remarkable, success. Careful quarantines, controlled movements, preventive inoculation, and the like, have resulted in lowering the mortality to a very great extent. The consequence is that herds are increasing in numbers and will increase still more rapidly in the future. Greater numbers require bigger measures of protection. The greater the numbers of stock, the greater will be any calamity which may fall upon them. Can we go on endeavouring to protect from disease increasing herds quickly approaching the stage, in some parts, where the available grazing will be totally inadequate? Can we view with equanimity a not far distant future when the calls upon the pastures will involve the destruction of herbage, and erosion, an urgent problem to-day, will turn vast tracts of land into waterless wastes? Lowered vitality of stock will create conditions under which no protective measures will suppress disease, and one of the major scourges will sweep across the continent. We have commenced the work and we cannot stand still and mark time, nor can we adopt a retrograde policy. Disaster awaits either. It has been shown that stock play an important part in an African's outlook. The political effect of a disaster, and the subsequent unrest, need not be described. Incidentally, the European settlers will share in the tragedy and the efforts of years of strenuous work be lost. It may be said that such conditions apply only to Africa. To some extent that is so, but protection against disease is having its inevitable effect in all places where the cattle population is sufficiently large to necessitate the maintenance of veterinary staffs. Disease-suppression without improvement in quality, stamina, or other conditions can scarcely be justified. Indeed, it will entail true progress in whatever manner demand dictates, if slaughter of unwanted animals is to be avoided, for a dual policy of protection and waste is absurd. Even in colonies where, as yet, the value of cattle depends upon their use as working animals, a policy of *laissez-faire* cannot be contemplated, as, in the course of time, this method of carrying out work must give way to mechanical devices and stock become of value in other directions.

No apology is made for including in this article a somewhat lengthy introduction, as, otherwise, all the problems which confront those engaged in improving the stock industry would not be realised; they are of such vital importance, and the indifference to them in some quarters, even official, so lamentable, that they cannot too often be reiterated. The necessity for progress, and for the right men to guide it, must continually be stressed. Too much time has already been lost.

Combating Disease

The suppression of disease must, as has already been pointed out, be one of the first steps in the progress of the cattle industry. Its necessity need not be argued, but it has a secondary effect in that it is one of the speediest ways of obtaining the confidence of owners, no matter in what sphere of life they may be. To preserve property, now and in the future, must inevitably evoke gratitude, and inculcate a desire for further combination of effort which will be of the utmost advantage. The average European settler, and others of enlightened standing, understand the nature of the work and usually co-operate. Even in these cases, the effect of well-executed precautionary measures, irksome though they may be, must always tend to better understanding and ensure fuller liaison. With less intelligent owners, it is, of course, often quite impossible to discuss the nature of the measures which it is intended to carry out. By some means or other (any question of force being ruled out unless the circumstances are most exceptional) the owner must be won over to co-operation on a small scale. The results of the first efforts largely decide the future attitude of the owner and his

neighbours. The beginning should be made, where possible, with some influential member of the community, so that the object-lesson may be emphasised. Needless to say, whatever the work undertaken, it should be organised, and carried out, with the strictest regard to reducing accidents and bad results to a minimum. Examples in all parts could be cited to show the effect of measures hastily conceived and indifferently executed. Large-scale operations, with insufficient staff or equipment, should never be attempted, unless the cause against which the precautionary measures are taken is such that the consequences of total inaction may be disastrous. Circumstances may arise when even inadequate measures may obtain some success and relieve what might otherwise be an intolerable situation. In all other cases restricted action, even if quite serious losses obtain elsewhere, is the only policy which will be followed by success among untutored people. The object-lesson is of such importance that what may appear to be a callous policy is justified.

Disease is divided, in the mind of the administrative veterinarian, into two classes: that which exists within his territory and that which may be introduced from without. His mind naturally first turns to the latter. He may be faced with many diseases in his territory but there are usually still others which may gain entrance. Some of the precautionary measures which are taken to prevent the importation of disease have been severely criticised, particularly that of total prohibition of the import of animals. At the present time New Zealand prohibits the importation of cattle from the United Kingdom owing to the presence of foot-and-mouth disease in the latter. It is not intended to discuss whether this action is, or is not, justified. It is quoted to demonstrate to what extent some countries are prepared to go to limit some of their problems to those which already exist. To the man who is sufficiently fortunate to find himself in an island territory, this first portion of his task is comparatively easy, but even he is often faced with difficulties which completely baffle him. Disease appears in spite of his efforts. The history of foot-and-mouth disease in England demonstrates the difficulties which have to be faced. Further, it is sometimes possible definitely to ascertain the means by which infection is introduced, only to find that the necessary measures cannot be carried out. Not infrequently, insufficient financial means, with its sequel, depleted staffs, are available; quite often, the economic consequences would render their imposition quite impossible. It is of little use to suggest the prohibition of an essential foodstuff, or of necessary merchandise which has to be imported in implicated, or suspected, packing. Theoretically correct, or even proved, precautions often have to yield to those which can economically be carried out. If the difficulties confronting such a one are many, how much more serious are they in a territory which forms part of a much wider area or even of a continent? Take the situation of Palestine, of India (or any locally governed portion thereof), or a colony in Africa. The borders are often a geographical line, not infrequently quite beyond, or only inadequately within, the control of the responsible government. The inhabitants of some adjoining countries recognise no boundary and move across it, with their herds, at will. Kenya and Tanganyika are typical in this respect. The boundary, a geographical line, cuts in two a great tribe. From time immemorial, portions of this tribe have used certain differing grazing areas and watering places as the seasons changed. To-day, certain Kenya natives cross to Tanganyika to graze or water their stock, and *vice versa*. Yet these two territories are under different governments, each with separate control regulations. They are not even under an agreed policy as regards some of their diseases. Take the case of Palestine, having across its borders a somewhat lawless people amongst whom veterinary control measures are unknown. In all parts of Africa a wedding usually entails the passing of stock as part of a bridal dowry, and the utmost ingenuity will be used to ensure delivery in spite of prohibition of movement or other regulations. And there is always the problem, common to so many of the less advanced colonies, of game movement.

It is axiomatic that precautionary measures against importing disease should begin at the borders. Now in the majority of colonies the more controlled areas are those which have first been settled for administrative, or other, purposes. The places for the former have often been selected for ease of communication, and the latter have resulted from missionary effort or industrial activity. Areas remote from these are usually difficult of access or only partially under control. Consequently, precautionary measures are often quite impracticable where they should first be started, *i.e.*, at the borders. Operations have, at first, usually to be limited to the areas of greatest influence and control, and gradually extended. Thus, measures designed to exclude disease are often those for the suppression or prevention of existing ones. The more settled areas naturally have in them the greater number of European or immigrant stock-owners, and this has led to a charge being made, by some critics, that public funds are the more readily spent upon those who can the more easily press their requirements or complaints. Unprejudiced study would dispel such a charge, as it is surely logical that the herds of all owners are safer if surrounded by a

buffer area of stock amongst which action for the control of disease had been taken.

Of what do the precautionary measures consist? They may be divided into four groups:

(1) Quarantine at ports of entry, where it is possible.

(2) Measures designed to check the carrying of the causal agent.

(3) Measures designed to confer an immunity upon the animals themselves.

(4) Measures designed to prevent that debility which renders an animal more prone to attack.

(1) In the more settled, and island, colonies, this group is important. If animals, or other carriers of disease, can only gain access at specified points, then the work of prevention is simplified to inspection, treatment, or quarantine for such periods as is considered necessary in the light of the available information regarding their source, the route, the length of time in transit, and other relevant matters. Advantage is often taken of the quarantine period to render the animals immune to certain local diseases by the inoculation of sera or vaccines. It has been pointed out that circumstances sometimes render adequate precautions at these ports quite impossible. It is usual, however, to continue those which are practicable, on the principle that at least some of the danger is eliminated.

(2) Many of the major animal diseases are caused by organisms or viruses which have a separate existence outside the animal itself, or are derivatives of organisms which are introduced to the animal. Although not entirely correct, that statement is sufficiently so for practical purposes. Some of the causal agents are easily recognisable microscopically, some are ultra-visible. The manner in which some can be transferred from animal to animal is known and can definitely be guarded against. In some cases the means of transmission are very numerous: in a few information regarding transference is yet to be obtained. In many colonies one of the methods adopted to prevent spread is one which is impracticable in more civilised colonies. It consists in establishing a cattle-free belt by moving all the animals in an area to a distance which is governed by the nature of the disease and the presence of suitable grazing and watering facilities. These belts may remain free from stock for a limited time only, but in some cases they have been maintained for so long that the owners of the stock have settled in the new areas. Occasionally, such belts are created as a permanent safeguard against disease from an adjoining territory. Fortunate indeed is a country which can maintain a permanent stock-free belt along a threatened border. Certain of these are in existence to-day. It will be realised, however, that it is by no means easy to bring about the evacuation.

The quarantining of districts, areas, or even herds, is a less difficult matter, but the relative smallness of the area often increases the difficulties of maintaining the isolation. Owners usually establish only grazing posts in the areas to which the stock have been moved, and proximity increases the tendency for the supervisors to leave their charges for a while in order to visit their homes. The animals themselves strenuously endeavour to return, and constant vigilance is necessary to prevent them. Nevertheless, this isolation is of enormous value in suppressing more localised outbreaks. Of the greatest importance in this group is the practice of dipping. The diseases caused by tick-borne organisms are of considerable economic importance in the majority of our colonies, and particularly those in tropical, or semi-tropical, zones. Indeed, where imported or highly graded stock is kept, it may almost be said that where there is no dipping, there will be no stock. Dipping is proving one of the greatest factors in livestock improvement in many parts of the Empire. It has an advantage other than that of disease prevention. When dealing with the less intelligent people, the weekly, or fortnightly, meeting at the tank provides an opportunity for inspection and educational work which is of great value. This aspect will be enlarged upon later. Nevertheless, dipping is not an unmixed blessing, and is accompanied by a grave danger. Indigenous animals of an undipped territory possess a very high natural immunity to the local strains of organisms carried by ticks. This immunity is a great asset and every effort must be made to maintain it, in as high a degree as possible, until such time, in the far distant future, when the ticks themselves have been eliminated. It should be the practice, therefore, to leave undipped all unweaned calves and to interrupt the continuity of dipping amongst the older animals at the period of lowest tick activity. In many colonies this period is associated with the colder weather or the seasons of limited, or no, rainfall. Indeed, circumstances often render dipping either impossible, or inadvisable, at portions of the year. One thing must always be borne in mind. The season during which constant and careful dipping should always be enforced is that immediately preceding the obvious tick activity. At this time the larvae are often feeding upon the animals and their destruction reduces the potential tick population to a very considerable extent. It is essential, however, that the greatest care be taken when the practice is first begun and an antidote to arsenical poisoning be made available. Any untoward incident may result in a severe set-back. Cattle should never be dipped when they are hot from a journey,

and should always be given an opportunity to drink immediately prior to immersion. One other precaution: the danger of spreading other diseases, when cattle come from all parts of an area surrounding the tank, must be guarded against.

Whenever cattle have been conveyed by rail from one district to another, the trucks should be disinfected. This is imperative when transmissible disease exists *en route*. All manner of reagents are used for this purpose, but the most efficacious and safest method is to use live steam. Depôts for this work have been established in some colonies. The boiler from an old locomotive is used. Litter is removed from the trucks and destroyed by fire, and the inside is cleansed by a stream of live steam, under high pressure, directed upon it through an armoured hose pipe. If the work is carried out in a careful and methodical manner, every crack and crevice can be efficiently treated, and the whole rendered sweet and clean. All fear of poisoning future occupants is avoided, and the work can be carried out with dispatch.

When dealing with a disease such as foot-and-mouth, the virus of which can be carried by so many agencies, the most elaborate precautions have to be taken. The actual mortality from this disease is seldom important; the losses being either from, or the result of, a consequential debility. The recent action taken by New Zealand has been referred to. One other example may be cited. When foot-and-mouth disease broke out in Southern Rhodesia some four or five years ago, and, subsequently, in the Union of South Africa, not only was a complete embargo upon all animals from these territories imposed by Northern Rhodesia, but the importation, or in-transit, of all vegetable or animal produce, all articles derived from vegetable or animal sources, and all merchandise packed in material derived from the sources indicated, were prohibited. Wagons and motor cars were compelled to pass through disinfecting baths, and passengers' luggage was examined and suspected articles removed. The resulting dislocation of trade was acute in both Northern Rhodesia and the Belgian Congo, a portion of which was quite cut off from the source of much of its supplies. The case is cited to show how complete must be the control, and to what extent dislocation of trade can be affected, when a country is threatened by one of the major diseases.

Adequate control of a disease such as rabies, where the reservoir of infection is in wild carnivora, is often impossible. Palliative endeavour is limited to the registration of dogs and the destruction of those not claimed, and similar measures for lessening the possibilities of transferring the infection to man.

(3) Without any doubt the immunising of animals against disease is now one of the principal factors in the prevention and suppression of disease. Problems which presented grave worries some years ago are now faced with some confidence, if finance, organisation, and staff are assured. The list of diseases which can be controlled by inoculation is steadily growing and includes anthrax, "quarter evil," rinderpest, contagious bovine pleuropneumonia, bovine contagious abortion, anaplasmosis, and piroplasmosis. The first two were important formerly and even to-day they cause grave loss where action cannot be taken. It is the practice for the more backward peoples to eat the meat of such animals as die. In many cases carcases are cut up and transported to various villages. Thus, spores of the organisms from the blood are scattered over wide areas, with subsequent outbreaks of considerable mortality. Safe and effective vaccination is now available. Reference has been made to the natural immunity of indigenous stock to the local strains of tick-borne, causal organisms of certain diseases, particularly redwater and gall-sickness. Imported stock may have a lower immunity, or none at all, according to conditions in the country of origin. It is now possible to confer an immunity upon imported stock. The process, however, is of some duration and not unattended by risks. Thus, it is usually confined to pedigree animals imported for improving the herds of a progressive farmer or rancher. Some years ago the benefits of conferring immunity, even though it was not complete against all strains, before such cattle as are exported from England were shipped, was recognised. To-day, a station exists at London docks where animals are treated under conditions which are extremely favourable. The virus is supplied by the laboratory of the Ministry of Agriculture at Weybridge, and is composed of strains received from as many sources as possible.

A suitable vaccine for controlling contagious bovine abortion is still being sought. A "live" vaccine is available, but it is only used in exceptional circumstances and should not be introduced to clean herds. It may be used where conditions make it advisable to endeavour to control the disease in the shortest possible time. The result is often the loss of a year's calf crop (though there have been exceptions), but this is previously taken into consideration. Immunity having been established in the breeding herds, there remains only the treatment of all heifers prior to the time when they will be ready to receive service. The less drastic manner of dealing with the disease is by diagnosing infected animals by means of the agglutination test, and placing them in complete isolation from all others. They are disposed of as circumstances permit. The policy is, of

course, continuous. It is usually adopted only in the herds kept solely for dairying purposes.

Although a means of immunising cattle against pleuropneumonia has been known for many years, only fairly recently has it been carried out in an adequate technical manner. In the Union of South Africa, where the disease existed for so many years, a "salted" (recovered or immunised) animal was of the greatest value in that, although it might break down, it enabled necessary work to go on. Farmers used to dip small pieces of wool into the exudate from the pleural cavity of an animal dead from the disease, and insert this into an incision in the tail of a clean beast. The virus was thus introduced into the blood-stream, but the operation was often carried out under conditions which resulted in septic sequelae, and swellings and sloughings of the tail and portions of the quarters were common. The swellings were countered by amputation of the tail or the actual cautery was applied to the quarters in the form of a ring. It was no uncommon thing to see spans of oxen, in many districts of South Africa, with only stumps of tails and with burned circles around the quarters. The method was crude, but it had advantages under the then existing conditions. The treated animals, however, were quite frequently infective, or potentially infective, reservoirs and capable of spreading the disease amongst clean stock. Although the pleural exudate of diseased cattle is still the essential factor in immunisation against pleuropneumonia, it is now treated in an adjacent, or field, laboratory in such a way that a more controllable reaction results upon its injection, and one which does not result in creating future reservoirs. The disease has quite recently been eliminated from Bechuanaland by a combination of immunisation and segregation of infected animals, which has proved the efficacy of the method upon a very large scale.

One of the diseases most dreaded by veterinarians is rinderpest. This may either appear as a scourge which sweeps through a territory with a truly devastating mortality, or it may settle down amongst stock which has become partially tolerant, and, as a result, presents a problem the solution of which is quite beyond the present practical and financial resources of the territory to solve. In those places where the disease does not exist it is possible that both these forms would follow the introduction of infection, the one following the other. Immunity from the disease can be produced, but the practice is not usually adopted in places other than those immediately menaced. The immunity is of two kinds—active and passive—varying according as antiserum is introduced with the virus or at a later date, and with the amount administered. Steps to induce active immunity are never taken except in districts where the disease actually occurs, as there is always the danger of setting up an infection which may result in an uncontrollable outbreak. Passive immunity is, as the name indicates, of limited duration and adopted amongst clean cattle menaced by an approaching, or existing, infection.

Work is steadily being carried on which has as its objective the conferring of immunity against other diseases. Particularly in connection with "virus" disease is an effort being made, and successful reagents are available against horse sickness and "louping ill" of sheep. Next to complete elimination of disease, or its causal agent, immunisation forms the most satisfactory, as well as the most spectacular work of the veterinarian in the Empire.

(4) So many of our colonies are situated within zones in which periods of drought or insufficient rainfall are a normal or frequent feature, that the maintenance of stock in health becomes a serious problem. Pastures not only provide the principal diet: in many cases they are the only source of foodstuffs. In parts of the year, therefore, many herds have to face conditions varying from insufficient nutrition to maintain complete health down to an almost complete absence of grazing. Their own state varies from poor to emaciation. Indeed, in some years it is almost miraculous how some of the animals exist at all on the available nourishment, and one wonders why the resultant mortality is not a total one instead of being merely heavy. Lowered vitality is a great factor in the susceptibility to, and spread of, disease, and the means for preventing it are amongst the most important with which a veterinarian is called upon to deal. As, however, he is by no means the only one concerned, and as they are most closely allied to the problem of stock improvement, they will be discussed under that head.

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Part II. The Improvement of Stock.

To speak of this subject as a problem is, perhaps, wrong; for it is a series of problems. Rival opinions whether the work should be carried out by the veterinarian, the agriculturist, or by a person appointed *ad hoc*, prove only that the position is not thoroughly understood. Administration officers, educationists, water-engineers, and many others, must all play their parts. It is not simply a question of improving breeds, but of creating conditions under which the improved animals can live and thrive. Naturally, the problems vary according to local conditions, the types and intelligence of the people, the purpose for which the animals are required, and so on. Completely varying conditions are often found in different portions

of the same colony. Much of the work required in some colonies must be modified, or can be eliminated in others. Short cuts can be taken and the rate of improvement accelerated. It is proposed, therefore, to treat the subject as though a beginning is to be made in a territory where the majority of the inhabitants are unenlightened and possess indigenous stock of poor quality living under primitive conditions. As the envisaged progress advances, stages will be reached which will, it is hoped, be applicable to conditions in other places.

The initial step should, it is suggested, begin with the educationist in association with the missionary. The efforts of the latter are, quite properly, being devoted to what may be described as the production of a good citizen, in addition to the purely religious work more generally associated with the name. So far as can be seen at present, the basic industry of most of our colonies must be in the future, as in the past, agriculture. To live, man must eat, and, in many places, he still eats in an inadequate manner. Whether it be for some foreseen, or potential, market, or simply for improving the dietary of the people, agricultural education should be included in all school curricula. The bias should be introduced at as early a stage as possible. So to educate a people that the result may be a nation of clerks is a folly which has been recognised, but the task of persuading backward people that the acquisition of information concerning the "three R's" is only the foundation, and not the ultimate goal, of education has not everywhere been grasped. By means of the pliable minds of the young much may be done. At all schools and mission stations there should be one trained to teach and demonstrate the principles of agriculture and cattle-mastership on lines laid down in an approved curriculum. Work in gardens, and with stock, should be undertaken daily at all places where the latter will live. The rate of improving these animals, and the conditions under which they are kept, should be but slightly in advance of those general in the territory, and should only advance further with the progress of the community in general. They should be object lessons under conditions which, though in advance of those seen in surrounding herds, are yet within the possibility of those in contact with them to emulate in after-life. At this stage, it is not so much the breed or quality of the animals themselves which matters, it is the manner in which they are maintained. To put it another way: bettered animal-mastership must precede breed-improvement. Attention has already been drawn to the indifference which is so often displayed by owners towards the welfare of their stock. There is no question that many owners would like to see some improved animals among their herds, but young and old alike must be taught that these can only follow greater care in management. The work among the young will be materially assisted by the educational methods designed to improve the hygienic conditions of the people themselves. In the case of stock, the argument of increased value will carry no less weight among the more primitive people than it does among the more enlightened. Except where stock cannot live, the training should be upon lines calculated to benefit a small, mixed farmer, for in that direction lies the future of the majority. No matter what be the basic crops, the presence of the herd of cattle is essential for providing food, for work, and for supplying organic manure. The educational system suggested has an added value by reason of the greater potential influence of some of the scholars. Demonstrators for the future guidance of the people will be required. Promising scholars should, at a convenient stage in their education, be transferred to institutions where their technical and practical training will be intensified. Naturally, not all will develop sufficiently well to be used for the purpose indicated, but the remainder will benefit considerably, and, perhaps, form the nuclei of better endeavour in districts.

Where the problems of stock-improvement are being tackled for the first time, it is not necessary to await the results of the education of the young. Training of the older people can begin. Reference has already been made to the dipping-tank and its use in general advancement. In few countries of the Empire is the use of the tank not necessary. The gathering of cattle, owners, and herds at the periodic times provides an opportunity of great value. First of all, the animals themselves can be inspected, wounds dressed, and other ailments treated. The attention of owners can be drawn to matters which are operating against the welfare of their herds. The benefits of the castration of superfluous and undesirable males; the segregation of old cows and immature heifers; the keeping apart from the herd of very young bulls or mature bulls which may be likely to mate with their immediate relatives or progeny, should all unceasingly be pointed out, as should also the necessity for careful selection of grazing grounds and the reservation of some for certain periods. The veterinary officer in charge of a district, and the stock inspectors under him, should make their periodic visits to villages and herds as frequent as possible to see that advice is followed and to point out the obvious improvements. They themselves should assist in the work of choosing pastures and sites for enclosures. The advantages of providing adequate shelters for very young calves, of allowing them a maximum of access to their mothers during their early days, and of running with the cows so soon as they are sufficiently

strong, should continually be stressed and demonstrated. It is impossible adequately to detail the thousand and one things which, the eye of a good stockman will see, require alteration, but one thing should continuously and increasingly be insisted upon—the importance of selection. The herds which are under consideration consist, of course, of relatively good, bad, and indifferent animals. Not infrequently, the two latter categories apply to the majority. The foundation of the herds of the future must be laid upon the better animals of to-day. By every possible means must the importance of selecting the bulls from the very best, and the sterilisation of the remainder, be stressed. The equal importance of heifer selection and proper mating must not only be pointed out but advice and assistance in the work must be readily given. Although it is impossible at once to eliminate undesirable cows and heifers, careful selection, and better mastership, will soon bring about obvious improvements in the herds as a whole with a corresponding encouragement. Furthermore, a supply of supplementary foodstuffs, for the period when grazing will be poor or insufficient, is essential. Experience has shown that it is too much to expect that crops will, for a long time, be grown especially for this purpose. There are, however, crop leavings, now abandoned, which could be stored with little trouble and expense, and a small beginning is possible with hay. To persuade primitive people to go to the trouble of cutting and storing hay will not be easy. Nevertheless, if persuasion results in starting upon a small scale, the results will, in some cases, arouse more than interest. As already stated, the object lesson is the principal thing at first. After that has been achieved, more intensive effort will find a much more encouraging atmosphere which will gradually lead the way to larger scale operations and the crops being grown *ad hoc*. This supplementary feeding can also be arranged for by conserving existing supplies. The countries of seasonal rainfall are usually those in the warmer zones, and the growth of grass, during the hot, wet months, is truly enormous. As the seasons change, the growth is dried to the consistency of hay and provides ideal conditions for fires upon a large scale. The miles of burning grass, in such countries as Africa, Australia, America, and others with tropical or semi-tropical conditions, must be experienced if a sense of the enormous loss they entail is to be realised. Nature endeavours to supply an allowance of foodstuffs for the whole year and very often its destruction could be prevented by quite simple means. Fire-guards can be created in many ways. The simplest, of course, is the burning of grass for a given distance all round the area it is desired to preserve. This should never be attempted unless conditions are ideal and the supply of man-power sufficient to prevent the flames getting out of hand and a general conflagration resulting. The preservation of some areas at the expense of others is not uncommon and often leads to recriminations which quite defeat the desired objective. The dragging of heavy logs around an area, as a preliminary to burning, is crude, but satisfactory. The ploughing of ground, where possible, is the most effective. Fire-guards which simply surround a large area are insufficient. Others must subdivide the whole, so that an accidental fire may be confined to the smallest proportions. Particularly must care be taken to isolate villages and homesteads from which there is great danger. There are those who advocate grass burning because of the resultant early springing of shoots. It is not denied that a burning of a small portion of grazing may be of assistance to weak or ailing animals, but continual burning destroys all the better grasses, as only the hardiest can survive. Also, the tender shoots are deprived of the shade and protection under which they would flourish. Lastly, a vast amount of manure, from the rotting, ungrazed portions, is almost entirely lost. At the dipping, or other convenient centres, instruction should be given in the treatment of hides and skins so that they may obtain the highest possible price upon the market. Much loss is sustained by the present haphazard flaying and drying. Improvements in this direction have been most encouraging in those colonies where instruction is in progress, and are of value in connection with operations to be discussed later.

All this while, the agriculturist has been busy with his work of discovering the advantageous portions of such crop rotations as may be practised, trying to eliminate the undesirable ones and to introduce others which will be of benefit to the potential farmer as food or for sale. The greater the variety of crops grown, the more the opportunity of salving crop leavings, and for introducing others designed to improve the general fertility, and to be available for stock. The agriculturist will be assisted by the stores of manure available from the more frequently moved cattle enclosures, for fertiliser production is now beginning to take the place of manure destruction. For a variety of reasons, restriction of stock at night (undesirable in principle as it is) must continue for a long time. For the reasons given, however, the practice is important in the general advancement. Together with the botanist, the agriculturist will be at work upon a grass survey and in exploring the possibilities of introducing new varieties. In co-operation with the veterinarian, both will note the effects of such restricted, or rotational, grazing as can be arranged. In his turn, the entomologist and

his colleagues will be probing the problem of making available new and extensive grazing areas by the elimination of tsetse fly and many other varieties which are detrimental to the well-being of man and beast in certain areas. Without going into details with which many readers of this article will be familiar, it is hoped that sufficient has been written to demonstrate how closely allied are all the various efforts which are essential in laying the foundations of future development.

At this stage it is proper to introduce a reference to a condition that in many colonies is already causing the utmost misgivings and becoming alarmingly acute. The condition is the destruction which is being caused by soil erosion and resulting in the formation of arid areas. The tendency for overstocking to be followed by soil erosion has been referred to. The matter is of the greatest importance, each day it is becoming more urgent, and yet in too few instances are measures being taken to check it. Many are those who have called, and are still calling attention to it. The voices are often not heard beyond a purely local radius; the reports drawing attention to the danger are often confined to those of only local interest. The answer given is usually that the resources of the territory, and particularly the financial ones, are quite insufficient to grapple with the situation. It is not too much to say that the policy we have adopted in some of our colonies, and to which reference has already been made, is to some extent to blame. Already areas have been rendered unfit for carrying stock, or for agricultural operations, and still more are rapidly moving to a similar fate. Many are the wrongs, imaginary or real, to which considerable attention is drawn, but rarely is anything said to make those, either at home or abroad, who can influence events, realise that something must be done at once to stop erosion. It is of little use to spend funds solely upon educating and uplifting a people, some of whom may be faced with actual want by the destruction of areas from which they have drawn supplies. No attempt will be made, in this article, to minimise, or ignore, the magnitude of the task. It will require the best brains and huge sums of money. It must, however, be pointed out that what to-day will cost a shilling to repair, may to-morrow cost a pound, and that the greater the delay the greater will become the problem. No attempt will be made to detail the work which will be necessary to check the danger; indeed, the writer is quite incapable of doing so. Amongst the efforts, however, the reduction of stock per acre, or the improvement of areas so that they will carry more, is of importance. The subject of erosion indicates the necessary co-operation of the water engineer in stock improvement. In all areas, conservation, or augmenting, of water supplies is essential. New supplies, many from underground sources, will have to be arranged for those areas which at present are not available to stock because of the absence of all-the-year drinking facilities.

The foregoing is, it is suggested, a résumé of the preliminary work which is required to ensure conditions that are necessary before breed improvement is begun. Some colonies are already at this stage; portions of others are nearing it; in many, however, the preliminary work is either in its most initial stages or has not been started. What are the steps which follow the completion of this preliminary work? Once again the problems become varied. In some colonies, or portions of them, the policy to be followed is indicated; in others it cannot be seen; in still others, what appeared to be the policy has had to be reconsidered. Whether the outlook be for dairying, or beef, both must be taken into consideration. There are quite a few who advocate, as the first step in breeding progress, the introduction of bulls of a zebu type. In some colonies, the Afrikander bull of South Africa has been conspicuously concerned. Nevertheless, the writer only agrees with such a policy when it is decided that a short cut may be taken and the preliminary work accompanied by some action in regard to breeding. If selecting indigenous animals has resulted in foundation stock of good, hardy, animals, he advocates a different policy. He would, at a calculated previous date, have imported pure bred bulls of one of our dual purpose strains. These would have to be kept under the best conditions possible. The cost of importation is high, and the potential value being great, avoidable risks cannot be taken with them. These bulls would have been selected for the hardiness of their strain and upbringing. The pampered progeny of show-yard stock would be completely ignored in favour of strong constitution and normal conditions. They would have been mated with carefully selected indigenous heifers and cows, and their male progeny again so mated. The resulting bulls would be issued for use among the herds considered ready for grading. The greatest care should be taken against a tendency towards undue haste. The policy should be very conservative and controlled, in its pace, by the progress made in management, pastures, and the provision of supplementary foodstuffs. The objective must be the introduction of some of the characteristics of the better breed, whilst preserving all the hardiness of the local animal, and allowing further improving mastership to exert its beneficial effect. It is almost certain that progress in pasture, and allied, improvement cannot keep

pace with the rate at which the animals themselves can be improved. It may be necessary again to introduce unrelated bulls of no higher grade than those already in service. No rule, other than that of local conditions, can be laid down regarding the grade of bull to be used. Procedure must entirely be governed by general progress, but the fact that haste may mean disaster should always be kept in mind.

In one respect, the writer is not at one with many who are engaged in the work under discussion, and he was greatly encouraged when he found that one of wide experience, and some eminence, agreed with him. It is well known that cattle improvement, when once started, cannot stand still and mark time. It must progress or retrogress. It is quite a usual thing to try to maintain a certain standard by the use of grade bulls. It is not intended to enter into arguments in this controversy; each must choose for himself the policy he adopts. After a given standard has been reached, the writer would never again use a grade bull. That standard has been reached, and passed, by many enlightened owners, and they have found that their very highly graded stock cannot be maintained, under normal ranching conditions, in some of our colonies. Degrading has become essential and they have introduced graded bulls in the hope of only slightly lowering the quality, and increasing the hardiness, of the animals. The characteristics of our pure-bred animals have been stabilised by generations of breeding and they can be relied upon to appear in the progeny of good sires. Who can say what atavistic abnormalities will follow the use of bulls which have unsettled blood in them? Up to a stage, such bulls must improve the herd; after that they may have an opposite effect. The writer believes that the correct policy is to introduce, each year, a number of selected heifers from less advanced herds. At the same time, a similar number of highly improved animals would be disposed of either by fattening, or, if suitable, for milking. For a very considerable time, such a policy will be possible. Conditions may then allow practically pure-bred animals to thrive. Up to now, only the dual-purpose bull has been mentioned; he can be changed, as circumstances direct, for either a beef or dairy breed. The foregoing indicates a policy which, conservative as it is, may well prove to be too rapid. Arrangements should be made, at the beginning, for maintaining herds of carefully selected indigenous cows and bulls which would be kept under hardening conditions. Some of the heifers could be put, each year, to the pure-bred bull, so that a supply of hardy second- or third-cross animals may be available to steady the early rate of progress. In another respect these herds will be of value. It is hardly conceivable that some of the transport in outlying districts, now carried out by means of oxen, will be replaced by mechanical traction for very considerable periods. The indigenous is still the only animal which can withstand work over long journeys whilst subsisting upon such grazing as is found upon the way. A supply of these in herds, from which they may be obtained by purchase or exchange, is essential.

Those conversant with the subject may well be thinking, after reading the above, that a policy has been put forward which entirely ignores certain factors that are among the principal stumbling blocks in many colonies. Reference was made earlier to the increased and increasing numbers of really poor animals which are, owing to limited grazing, uncontrolled in-breeding, and other causes, deteriorating still further. The quality of many of these is so poor as to make it almost a sheer waste of time to endeavour to improve them. They cannot be destroyed without compensation, and, if they remain alive, they will continue to breed. It has been stated that quality, not quantity, must be the objective. How can it be attained? Only by improving the selected animal and eliminating the unfit. This can only be brought about by creating a market. The stimulus of progress has always been demand. There is no demand for these wretched animals, and, therefore, one must be created. Simply to destroy them, and compensate the owners, would be to encourage a policy of drift and destroy the value of the educational work advocated. It is suggested that centres should be established, financed by public funds but supervised by men of proved business capacity, for dealing with undesirable animals. At these centres, the hides would be treated by up-to-date methods and graded for sale. The carcases would then be "fleshed" and the bones, after sterilisation, ground down. The flesh and offal would be boiled, all fat removed, and dried. A portion of the bone meal could be sold for feeding; the remainder, mixed with the ground flesh and collected blood, put upon the local market as a fertiliser. It is suggested that this fertiliser might well play a part in the general agricultural progress of the territory concerned. The fats would be converted into the cheaper forms of soap and candles for which there is always a steady demand. It may be that experience will show that other valuable by-products may be manufactured at these centres, and attention should be given to the possibilities of utilising the extracts from certain glands as a valuable side-line. It is many years since the writer first advocated this policy, which was criticised by some as impracticable. Within the last three years a centre was started by the municipality of Nairobi. Reports of the results of the work-

ing are available and are so encouraging, both economically and financially, that the Kenya Government has applied for a grant from the Colonial Development Fund for installing larger plants. An announcement in the Press, since this article was begun, states that the application has been successful. The writer makes no claim that these centres will at once become a source of profit, but the experience at Nairobi demonstrates that, under careful management, they will not be a source of concern to taxpayers. It may well be that unforeseen development will cause them to be of some financial assistance to the other work in progress.

What animals should be treated at these centres? For the time being, and probably for years to come, principally those which are of the greatest potential danger. The itinerant officers, engaged in development, would choose from the herds the poor quality heifers and younger cows. Older cows, too, would be accepted if the plant was capable of handling the numbers available. Another class of animal will be mentioned later. A hard and fast condition for the purchase from any herd would be to start castrating all male animals not selected by the inspector as adequate for breeding. The centres should be so situated as to allow ample grazing facilities in the vicinity, so that reserves may be established to ensure that operations are maintained at the most economical working rate. Adequate precautions will have to be taken, of course, for protecting the animals, which will have travelled from many sources and over various routes, awaiting slaughter. The dangers will be well known to the administrative veterinary staffs of the territory. Delivery of animals at the centre will be the responsibility of the vendors, who should receive payment when handing over the animals.

There still remains the disposal of the better surplus animals, particularly the bullocks. In many colonies industrial effort has created steady markets which, there is reason to believe, will continue to increase. In certain colonies the demand for good meat is far beyond the power of local sources to meet. In all there is a certain amount of demand. In some of our more backward colonies, however, the total demands are quite inadequate. Here, then, a further demand must be created. An improved dietary is almost always a necessity among backward people. Meat eating is often a matter of feast or famine. Feast, when rites indicate the killing of stock or when the mortality among animals is high; famine, at other times. Provision for day-to-day consumption is usually lacking. Every effort should be made to foster the habit of consuming meat and milk daily, which is now being stimulated by the increasing industrialism in some colonies. Wherever labour is employed, either domestically or otherwise, it is becoming the practice (often obligatory) to include fresh meat in the daily ration. Those employed go back to their homes with a developed taste which will be satisfied if possible. Most encouraging results have followed an attempt started in Uganda a short time ago. This colony has, as yet, few of the larger industries to employ its surplus population or absorb its produce. Arrangements were, therefore, made to divert to the more thickly populated areas a movement of cattle, which were slaughtered and sold in joints at markets and other meeting places. The result is an increasing demand in the most unexpected places. New areas are being explored as opportunity admits, and it would appear that this trade may become important. The evidence available to-day shows that the dreams of some can become successful realities if initiative, outlook, and sympathetic co-operation by those in authority, are assured. Starting in a similar direction to those in Uganda, and in many places assisted by a regular demand from industries, the flow of the better bullocks in the proper directions should be organised and controlled. It may well be that the demand will still be far behind the supply. The less desirable of the better animals must be diverted to the disposal centres where their value will cause them to fetch a better price than the others dealt with; and the local markets must be encouraged to their utmost absorbing power. The benefits are apparent to all. The price paid at the centres will, naturally, vary in different colonies; it may even do so in the various districts of one territory. An ordinary value in one colony might be an absurd one in another. The great thing is that a price of some kind be paid for animals which are at present worthless. The graded stock of enlightened settlers are already being exported, sometimes assisted by the local government. It is suggested that the costs may be lowered, when the time comes, by exporters purchasing the best of the indigenous improved stock for " finishing " in the more advanced, and particularly the arable, areas. Such a policy might have far-reaching effects.

Up to now only meat supplies have been discussed. What of dairying? Here again a beginning can and has been made. Creameries should be created in selected areas where there is a large cattle population. The areas will for some time have to be limited to those within easy transport to a railway. The general policy in any country should be dairying in suitable, accessible areas and beef production in the more outlying parts. Like most other policies it will have to be modified in the light of local conditions. To the creameries would come the daily milk supplies, probably collected from

arranged sub-centres. Not only would butter, or ghee, be manufactured, but also cheese and dried milks. Whey and other products would be available for an incipient pig industry, and for the rearing of calves—a task which may have to be delayed owing to the advisability, in some cases the necessity, of leaving calves with their mothers and disposing only of surplus milk. Even at present, however, many settlers could use with advantage such milk products as were available at a reasonable price. Dried milk is, unfortunately, a necessity in many places, and there should be opportunity in the expanding market.

Turning now to the smaller stock, the writer feels that, with the exception of the pig, an attempt should made to develop these animals in the direction indicated by experience in certain colonies, that is, for the value of their pelts. Indeed, it often appears to be the only justifiable, or possible, one. Sheep should, it is suggested, be encouraged very slowly. It is difficult to see how, in many cases, they could be nursed through the period necessary to fit them for competition in world markets either as mutton or wool. It is realised, of course, that sheep form the majority of the stock of some colonies and that attempts must be made to increase their economic worth. The writer feels that suggestions to this end must come from others more experienced. With goats, it is different. In quite a short time, Nigeria, for instance, has become an influencing factor in the pelt market, and it would appear that more general progress in this direction is justified. There is no need to enlarge upon the necessary steps. Control of diseases, especially those which affect the skin and with which the entomologist is closely concerned; improvement of breed and nutrition; and, finally, carefully supervised treatment and grading of the skins, are the general lines. The importance of further work upon internal parasites must be stressed. In pig breeding, too, it is thought that a conservative policy should be followed. Some progress may be entirely justified in selected areas, and the pig certainly has a place in the sphere of things when the envisaged small mixed farmer becomes more of a reality than he is. Specialised effort by settlers may also be possible. It is felt by many, however, that the encouragement of the small animal industry should, in those places where it is only part of the problem and not the only one, proceed upon such conservative lines as will permit further consideration when the outlook becomes more clarified.

Reference must be made to the value of co-operation in stock advancement. The necessity for careful supervision and guidance in some colonies has been emphasised. Those responsible should ever have in mind the binding of all effort in co-operative systems that would include all classes engaged in agriculture. Exploitation of backward by more enlightened people is not unknown; competition from cheap sources may imperil the needed efforts of the more advanced. An endeavour has been made, in this article, to show how a progressive man may assist, and be assisted by, his less advanced neighbour. Adequately controlled co-operation, resulting in mutual benefit, is essential to success.

As previously mentioned, there are people who hesitate to recommend improvement in the animal industry of the Empire. Some of the doubts result from selfish fear; some result from honest consideration; other come from sheer indifference. We have, however, taken upon ourselves to guide the destiny, and influence the future, of many countries. Having created conditions which demand further effort, that effort cannot in common fairness be denied, and the foregoing is a suggestion as to the lines upon which it should be made. The majority of cattle owners in our colonies are still in a somewhat backward stage. Some are much advanced, but even they have too often neglected the general advance in conditions which are essential to an animal industry. There are sure to be some who disagree with points in the policy outlined; their views may be correct. The purpose of the article is to bring the subject to notice, and, if possible, to arouse that interest in the necessity for action which is too little evident. It is a plea that uncertainties arising from what may happen in generations to come may be put aside, and that an honest effort be made in the right direction, sure in the knowledge that unseen solutions will be found for future problems.

Since the foregoing was written an interesting experiment has been announced from Nyasaland. With a view to bettering the people and the native milk industry, clinics for children have been established at which milk from adjacent herds will be used. Inducements are being offered for quality and continuous supplies. The results of this experiment will be awaited with interest.

ARMY VETERINARY SERVICE

Movements of Officers

Captain J. V. Tevlin was posted from Hounslow to Aldershot on August 18th.

Major C. H. S. Townsend, O.B.E., M.C., F.R.C.V.S., was posted to Woolwich on September 1st.

Captain R. K. Kent was posted from Bulford to York on September 7th.

Major C. Holland, M.C., Lieutenants G. D. Young and D. A. Green, sailed for India for a tour of duty abroad on September 14th.

Major J. P. Hegarty, M.C., and Captain D. F. G. Smith are at present in this country on leave *ex* Egypt; Major D'A. S. Beck, *ex* India.

The Veterinary Record

September 25th, 1937.

Empire Problems and the Veterinarian

In what may justly be looked upon as the greatest monument of true literature fashioned by a veterinarian, Leclainche has inscribed a rare tribute to this journal. In his recently published *Histoire de la Médecine Vétérinaire*—which is something far more than a mere history, indeed a veritable "natural history" of our profession and such as could only be written by a man of his great experience and culture gained as a veterinarian—he says, after commending our leading articles: "*Le* Record *est l'un des journaux les plus vivants et les plus intéressants de l'époque.*" Coming from a man of his unique international authority, the founder of the *Office International des Epizooties*, and acknowledged supreme erudition in his own country, nothing could be more heartening to us, acutely aware as we have often been made to feel of our own shortcomings, at this critical stage in our own history. While not a prime repository for the stereotyped communications of laboratories, we are glad to be acknowledged a liying mouthpiece of a live profession, convinced as we are of our capacity to undertake the many and varied tasks that await us within the public economy and determined by all lawful measures to secure the means to fulfil them to our own honour and credit. Nothing at this stage would depress us so much as to be told we are moribund.

Hence, for some time we have been representing with some vigour and, we hope, with all fairness, the part which the profession can play in the betterment of livestock in Great Britain—in due time, we hope, in full harmony with the projects as mooted by Government at the instigation of a wise, youthful and enterprising Minister, who we may say has fully won our confidence by his understanding of our outlook and willingness to adjust accordingly his plans of action.

We feel, however, that it has not been our happy lot to meet with a similar response in treating with other departments of Government, which have to minister to the welfare and destinies of countless millions of the Empire's subjects. And, in this country's application to, or infliction upon, these peoples (whichever way the reader may wish to interpret this custodianship) of our systems of development we feel we shall as a profession earn lasting reproach at the bar of history if we do not rouse these departments to a sense of the urgency with which paramount questions affecting the livestock economy of Empire countries demands the recognition and the fullest utilisation of the skilled services of the veterinarian.

As our colleague, Mr. J. Smith, whose advice in council we are glad to find the Government has been wise enough to seek after his intimate experience in Northern Rhodesia of the problems we now wish to bring into relief, says at the conclusion of the article we reprint in this issue: "We have taken upon ourselves to guide the destiny, and influence the future, of many countries. Having created conditions which demand further effort, that effort cannot in common fairness be denied . . ." We may well go further, and declare in all earnestness that if, through supineness, we deny such effort the history of the decline and fall of another great empire may well be written to start from this generation. It is the French who have reproached us in the past that as colonisers we have done a good deal for the countries we colonise but little for the peoples. The intimacy with which the peoples of our dependencies are bound to their livestock is depicted with admirable clarity by Mr. Smith; it is an intimacy which to the ordinary citizen of this highly urbanised, territorially minute, island country surpasses his comprehension, and the very vastness of the problems is such that we feel we cannot notice them adequately save in a succession of editorial articles. Written primarily for the lay reader, by a man of experience (and obviously a man of action) and not an experimentalist, and hence by the type of worker from whom written communications have been far too rare, the survey passes under almost kaleidoscopic review a large number of themes each of which could well be extended to the compass of a studied monograph.

At this stage we need only call attention, as we have done in the past and shall doubtless have reason to do often again, to the need for implementing to the full and as soon as possible all the provisions which were so admirably laid down by the discerning men who compiled the Lovat Report. In that Report, the consciousness of Government was tardily awakened to the decay of our principal veterinary teaching institution at home when it was castigated as

a "national disgrace." With no less measured language shall we feel impelled to condemn the neglect by Government departments of the peoples of our vast Empire through the apathy shown to their essentials of livelihood, which are comprised to a remarkable degree in their livestock—the relevant problems connoting primarily, as Mr. Smith has well said, suppression of disease, and secondarily, the improvement of stock along the lines he has traced, by better feeding, selection, and weeding out of the unfit. Neglect to implement the provisions of the Report constitutes, in truth, an Imperial disgrace. We are surprised that the present Secretary of State for the Colonies, who was part author of the Report, has fallen behind in the execution of what not many years ago he clearly saw as a plain duty.

CASEOUS LYMPHADENITIS: CRITERIA OF MEAT INSPECTION

The Ministry of Health has issued a supplementary memorandum (Memo. 62A/Foods) modifying as regards caseous lymphadenitis the criteria of meat inspection recommended in Memorandum 62/Foods. The following new Section is to be added after Section IV:—

"Section IVa.—*Detailed instructions for routine inspection of carcases of sheep and lambs and action to be taken in the event of caseous lymphadenitis being found.*

"The prescapular, superficial-inguinal or supra-mammary, precrural, iliac, lumbar and renal lymph glands shall be exposed and examined by incision and the kidneys shall be freed and examined, but not necessarily detached from the enclosing fatty tissue.

"*Viscera.*— The viscera shall be condemned if they are infected in any degree or if the whole carcase is condemned. If the viscera are free from any lesions they shall be passed unless the whole carcase is condemned.

"*Carcase* (including the head).—If on examination as indicated above, more than one lesion is found, the whole carcase, including the head, and the viscera shall be condemned. If one lesion only is found the carcase shall be cut into the following sections, carrying the lymphatic glands indicated." [Here follows a list of sections.] "These sections shall be further examined and if no further lesion is found, all the sections, except that in which the one lesion found at the first examination is situated, shall be passed and the affected section condemned. If one or more further lesions are found, whether in the same section as that in which the first was found or in another section or sections, the whole carcase, including the head, and the viscera shall be condemned."

CLINICAL COMMUNICATION

A "Roaring" Operation and Its Sequel

FRANK CHAMBERS, F.R.C.V.S.
WOLVERHAMPTON

In May, 1935, I was called in by the tenant of a small holding to examine a cart gelding, one of his two farm horses. The owner complained that the horse had become "broken winded" and was unable to work. The gelding was a very useful type of clean-legged draught horse in very good condition, and would be about 14 years old. On examining it I soon found that it was not broken winded but was a very bad "roarer." On being trotted it roared so badly that acute respiratory distress was soon evident. Counter irritation to the throat was applied at the owner's request but it was pointed out to him at the time that such treatment was not likely to do much good as there were no symptoms of a local inflammatory condition which might be responsible for the "roaring."

I saw the gelding on June 23rd. It was no better; in fact, it had progressively got worse. Two days before, when let out to drink, it had rolled and the exertion of so doing caused such respiratory distress that it stumbled into the pond and had to be dragged out. I suggested a "Williams" operation but the difficulties connected with the throwing were obvious. Any exertion brought about great respiratory distress and the struggling which would take place during the casting might provoke a fatal suffocation. It was agreed to operate and after due preparation a tube was inserted in the trachea under local anaesthesia. Three ounces of chloral were then given with the stomach tube. As, at the end of forty minutes, no effect had been produced, and as it was getting late the hobbles were put on and the gelding cast.

Some considerable difficulty was met with in administering the chloroform. The lumen of the tracheotomy tube had to be closed during inspiration, otherwise no chloroform was inhaled. If a bout of struggling took place the administration of the anaesthetic had to be suspended until the respirations became more or less normal. Eventually the gelding was anaesthetised and on opening into the larynx it was noticed that both arytenoids were paralysed. The ventricles were stripped with some difficulty, as the gelding had such a "deep" throat. It did not progress as well as might have been desired as the wound became very infected and a bad septic laryngitis and tracheitis resulted. The tube was taken out on July 27th and the wound in the trachea allowed

ABSTRACTS

Epidemiology of Foot-and-Mouth Disease. (Trans. title.) Drouin (1937.) *Bull. Acad. vét. France.* **10.** 5. 195-201.]

A graph is shown illustrating the occurrence of outbreaks of foot-and-mouth disease in France from 1886 until the present day. Serious epidemics occur approximately at three- to five-year intervals; during the intermediate period the number of reported outbreaks decreases very considerably. The largest number of epidemics occurred in 1919 and 1920, following the extensive movement of cattle after the War, and due to the introduction of virus from other countries. During the past 15 years, the number of epidemics has been at a constant high level until 1936. In most of the more serious outbreaks the mortality has increased considerably. The incidence of the disease in other Western European countries shows a corresponding fluctuation.

E. C. H.

* * * * *

Some Investigations on the Virulence and Growth of the B C G and other Tubercle Bacilli. Holth, H. (1937.) Norske Videnskaps Akad. Oslo. I. *Mat-Naturv. Klasse.* No. 5.]

The author has succeeded in exalting the virulence of B C G in two different ways. By repeated subculture through 14 generations on a medium containing coagulated serum and tuberculin a culture was obtained capable of producing a chronic disease in guinea-pigs with death in 22 months. Furthermore, by injecting B C G into a guinea-pig and re-isolating on culture medium within a few days, the whole procedure being repeated several times, a strain was obtained highly pathogenic for rabbits and capable of producing a reaction in calves. The process of animal inoculation and re-isolation was used with a view to separating and cultivating the more virulent elements of the original B C G culture. Evidence of this type emphasises the danger which may underlie the use of living vaccines in tuberculosis prophylaxis.

E. J. P.

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Studies on Tuberculin. Russeff, Chr. (1937.) (In three parts, first part working in conjunction with Henniger, E.) *Zeit. Infektkr. Haust.* **51.** 2. 114-150.]

Working with guinea-pigs, the authors found that a small proportion (about 7·0 per cent.) of non-tuberculous animals which were infected with *Brucella abortus* gave positive reactions to the tuberculin test if "old tuberculin" was used. The use of synthetic tuberculin prepared on Dorset's synthetic medium reduced the proportion of non-specific reactions to 3 per cent.

The above information has been applied to the standardisation of tuberculin and a method has been evolved whereby new batches of tuberculin are compared with the standard, by inoculation not only into tuberculous guinea-pigs but also into Brucella-infected animals. In this way it is possible to compare both the specific and non-specific reactions of the new product wtih those of the standard.

To ascertain the best medium for growing tubercle bacilli in the preparation of tuberculin, Dorset's and Sauton's synthetic media have been compared with glycerin broth. Human, bovine and avian types of tubercle bacilli all gave the most copious growth on Dorset's medium. Furthermore, tuberculin prepared with this medium gave the clearest specific reactions in tuberculous animals and fewest non-specific reactions in healthy or Brucella-infected ones.

E. J. P.

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On the Occurrence of Copulation Infection among Cattle with Infectious Abortion. Thomsen, A. (1937.) *J. Comp. Path. & Therap.* **50.** 1. 1-9.]

The author infected three bulls in the prepuce with ground-up infected placental material. Fifteen heifers were covered by these three bulls. The result was that five of them aborted, five calved normally and five failed to become pregnant. Four control heifers calved normally. It is emphasised that only half the pregnant heifers aborted although all the animals were exposed to massive infection, and it is suggested that there is considerable resistance to infection when pregnancy commences. The incubation period was very long in these experiments, an average of 225 days.

D. L. H.

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to heal. The horse was tried four weeks later and went very well: a certain amount of "noise" was made when ploughing in heavy ground but the operation appeared to have made quite a serviceable animal of it.

On March 7th, 1936, I was called in to see the same gelding as it was "scouring" very badly. Various remedies were tried but nothing would stop the enteritis. The faeces were putty coloured and very evil smelling. Liver affection was diagnosed and the gravity of the horse's condition was impressed upon the owner. The gelding died a few days later. *Post-mortem* examination revealed a condition of cirrhosis of the liver. There being no ragwort on the farm, Senecia poisoning could be ruled out. It is more than probable, however, that the large dose of chloral caused the abnormal condition of the liver. I have on several occasions noticed grave alimentary and liver disturbance in horses following the administration of large doses of chloral hydrate.

[**Gastro-Intestinal Motility in Ruminants.** Dukes, H. H., and Sampson, J. *Cornell Vet.* **27.** 2. 139-149.]

With the object of studying more particularly the movements of the omasum, abomasum and intestines, the authors adopted the open saline bath technique of Alvarez for these experiments and used 16 old ewes anaesthetised by intravenous injection of chloral hydrate. The abdomen was opened from the xiphoid cartilage to the pubes and the animal was placed on its back or side in the saline bath heated to body temperature, the edges of the wound being retracted. Several variations in technique were used in attempts to increase motility; of these, section of the splanchnics and the introduction of warm liquid paraffin into the abdominal cavity appeared to be most successful. Gastric and intestinal motility was studied by direct observation.

The rumen showed no spontaneous motility beyond small wavelets except in the end blind sacs in which pendulum contractions, travelling waves and strong tonus were seen. Electrical stimulation of the vagus caused contraction of the whole organ. [The authors' omit to mention which vagus was used for stimulation throughout; as the two vagi control different parts of the ruminant stomach, this should have been mentioned.]

The double contractions of the reticulum were only occasionally observed, peristaltic waves and small wavelets being the only spontaneous movements seen. Vagal stimulation caused a quick, powerful contraction followed by a quick relaxation.

The omasum showed no spontaneous activity. Vagal stimulation caused a contraction of the whole wall but no movement of the leaves was seen through a T-shaped incision in the wall.

The abomasum gave better results. The fundus remained quiescent, the body showed intestinal-like rhythmic segmentatory movements, the pyloric part showed peristaltic waves running towards the pylorus. All parts responded by contraction on vagal stimulation, the fundus contracting least.

Satisfactory movements of the small intestine were seen after initiation by pilocarpine and allied drugs; in some cases they occurred spontaneously. Pendular movements, peristaltic rushes and rhythmic segmentations were seen, the latter preponderating.

The caecum and proximal colon showed similar movements. These were marked peristaltic and antiperistaltic waves which in some cases produced a regular to and fro motion of the ingesta. The authors consider the function of the caecum to be mainly mechanical, its size being too small to allow much bacterial fermentation to take place.

The spiral colon showed continuous rhythmic segmentations and pendular movements. Pellet formation was first seen here, indicating rapid water absorption.

The authors regard these experiments as preliminary. No attempt has been made to correlate their results with those of Continental workers.

A. T. P.

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[**Haemorrhagic Septicaemia Investigations. The Significance of Pasteurella boviseptica Encountered in the Blood of Some Florida Cattle.** Sanders, D. A. (1937.) *J.A.V.M.A.* **90.** 6. 737.]

Attempts to produce septicaemia in calves, yearlings and cows by spraying the nasal passages, feeding, etc., with material containing virulent *Past. boviseptica* failed; nevertheless, these methods led to foci of infection which remained for at least three months.

In field and experimental observations it was shown that while *Past. boviseptica* could be isolated from the blood following death from such causes as *Anaplasma marginale* infection and *Crotolaria* poisoning, it was rare to isolate a Pasteurella organism from this source before death. The general conclusion appeared to be that *Past. boviseptica* was often a *post-mortem* invader and its isolation might lead to an erroneous diagnosis.

In further experiments it was shown that Pasteurella organisms might be isolated from the blood of cattle before death following railway transportation; in these cases they were possibly the cause of death, although the author does not make it clear whether this is his opinion or not.

Calves given an umbilical injection of *Past. boviseptica* developed omphalophlebitis.

Finally, for some reason not made clear, the pathogenicity of *Past. boviseptica* was determined for crows (*Corvus ossifragus*). It was found that acute and chronic infections could be set up.

F. W. P.

LAHORE ABATTOIR PLAN ABANDONED

The Simla Correspondent of *The Times* informs his journal that the Government of India have abandoned their plan for an abattoir and cold storage plant at Lahore, although construction had begun. He adds that, in a statement explaining the reasons for this action, the Viceroy points out that while the scheme was originally approved by the Punjab and Central authorities as calculated to promote economic and industrial development in North-Western India, the growth of public opinion in opposition to the project on the ground that it offended religious susceptibilities had induced the authorities to drop the scheme. The loss to the taxpayers is calculated to be about 50 lakhs (£375,000).

REVIEW

["**Principles of Medical Statistics.**" By Dr. A. Bradford Hill (Reader in Epidemiology and Vital Statistics in the University of London). Pub. by *The Lancet*, Ltd., London. (1937.) Price 6s. net.]

Medical and veterinary experimentalists who are compelled to work with animals, have long felt the need of a book dealing with the principles of statistics without delving into long and, to them, complex mathematical proofs. In the opinion of the reviewer, such a book has at last come to hand and *The Lancet* is to be congratulated for asking Dr. Hill to prepare these chapters at first for the journal and subsequently in agreeing to their publication in book form.

Almost every page of the work is easy to follow and the reader readily understands both the significance and the limitations of the statistical approach to his problems. Attention is designedly confined to the type of simple experimental arrangement with which medical and veterinary workers are familiar. The author wisely emphasises, in the early pages, that "it is a serious mistake to rely upon the statistical method to eliminate disturbing factors at the completion of the work. No statistical method can compensate for a badly planned experiment."

In the first chapter the aim of the statistical method is lucidly discussed. This is followed by a useful chapter on selection. The third and fourth chapters, dealing with the presentation of statistics and the variability of observations, are no less valuable. Then follows a series of chapters dealing with methods of aiming at the statistical significance of results obtained and here standard deviation, averages, proportions, differences and χ^2 are clearly discussed in a manner remarkably free from mathematical terms. After a few more chapters on statistical methods the author devotes four excellent chapters to a discussion of common fallacies and difficulties wherein he takes simple examples from the work of experimentalists and shows how the experimentalist not infrequently commits grave errors through his ignorance of statistics. These four chapters should be read and re-read by every veterinary experimentalist, for they contain by far the best and clearest account of such errors as yet presented. No medical or veterinary experimentalist will fail to gain much from their studied perusal.

In the opinion of the reviewer, this publication is of great worth to every veterinary research and field worker, and will certainly more than repay any purchaser. We cannot do less than congratulate the author very warmly upon his book.

REPORTS

Colonial Development Advisory Committee

EIGHTH ANNUAL REPORT*

Grants and loans for assisting many schemes to improve the social, economic, medical and transport services in several British Colonies are mentioned in the eighth annual report of the Colonial Development Advisory Committee.

Water Supplies.—In many parts of the Colonial Empire the conservation of water supplies and the discovery of new sources of supply are an essential foundation of the progress and development of the territory. A series of expert investigations carried out in Tanganyika disclose that measures must be taken without delay if the natural resources of the territory are to be properly developed and, indeed, protected from ruinous deterioration. In particular, they demonstrate that the future prosperity of the inhabitable parts of Kilimanjaro and Meru and of their foot-plains, which form one of the most important, fertile and densely populated areas of the territory, is in grave jeopardy unless immediate steps are taken to conserve and put to more advantageous use existing supplies of water, to effect increased re-afforestation and protection of forests, and other anti-soil erosion measures. In Kenya, it is said, the opening up of new areas to cultivation and habitation within easy reach of existing markets is not only a necessary contribution to measures already being taken to control soil erosion and the exhaustion of land; it also, in effect, adds to the area of the Native Reserves by bringing into beneficial use and occupation land which without water supplies must remain useless. In Bechuanaland Protectorate, many natives and large quantities of cattle in N'gamiland depend upon the rivers for water, crops and grazing. These rivers, however, are being gradually silted up and also choked with weed. Assistance totalling £133,410 was recommended towards water schemes in the above and other colonies.

Trypanosomiasis.—The incidence of sleeping sickness in Nigeria has assumed alarming proportions and threatens to have a far-reaching effect on the future prosperity and happiness of the people. Before the British occupation, the native population, owing to the unsettled state of the country, lived for the most part in large walled towns. They did not dare to farm away from the immediate vicinity of their

*Colonial Development Advisory Committee. Eighth Annual Report, April 1st, 1936 to March 31st, 1937. London: H.M. Stationery Office. Price 6d.

homes; moreover, when a tribe became weakened through disease it soon fell an easy victim to the attacks of its enemies and might often be exterminated, and the disease with it. Under the shelter of British rule, the people have now been enabled to settle in small villages in rural areas. This, together with the increased facilities for trade and travel arising from the progressive settlement of the country, has created conditions conducive to the spread of the disease. Its ravages are causing not only depopulation on a distressing scale, but also a decline in the efficiency of the remaining population in the affected areas.

The arrest of the disease is, therefore, of prime importance to Nigeria, an essentially agricultural country. A scheme, the total cost of which will be £275,000, has been devised which covers not only mass surveys and the treatment of nearly 100,000 persons per annum but also an extensive system of clearing and re-settlement of the population in tsetse-free areas, with a view to obviating the danger of re-infection. It is towards the latter parts of the scheme, which are of a capital nature and which should lead to an increasing number of people living in effective occupation of the land, to improved methods of farming and to intensive cultivation replacing the present wasteful system of shifting cultivation (which is so detrimental to forest protection) that assistance from the Colonial Development Fund will be directed.

The problem of sleeping sickness also assumes great importance in East Africa, where research work upon trypanosomiasis has been in progress for many years and has been the subject of special review on two occasions within the last three years—once by a special sub-committee of the Tsetse Fly Committee Advisory Council and, more recently, by a conference, held at Entebbe, Uganda, on the Co-ordination of Tsetse and Trypanosomiasis (Animal and Human) Research in East Africa. Special attention was paid during both these reviews to the question of co-ordinating research work on trypanosomiasis so as to avoid duplication of effort. In 1934, a grant was made from the Colonial Development Fund for the continuance for a period of three years of special research work on *Trypanosoma rhodesiense*, which has been carried out at Tinde under the supervision of Dr. J. F. Corson, O.B.E. Dr. Corson has devoted himself to the work for a number of years and his special experience has been invaluable. The immediate issue raised in this work is the relation of human trypanosomiasis to the disease in domestic animals in a wild state and the part which may be played by such animals as reservoirs of sleeping sickness infection. In the course of a number of experiments directed towards establishing the transmissibility or otherwise of infective trypanosome strains through animals to man, Dr. Corson, his assistant, Mr. H. C. Smith, of the Veterinary Department, and an African assistant, exposed themselves to the bites of infected flies, or to inoculation from infected animals. As a result Dr. Corson and the African assistant developed sleeping sickness, this proving that certain strains of *Trypanosoma rhodesiense* had not lost the power to infect man through a stay of a lengthy period in the bodies of animals. A further free grant of £11,726 is being provided to carry on this work till the end of 1941.

Bovine Pleuro-pneumonia in Kenya.—A free grant of £6,580 was recommended to provide for the salary and expenses, for a period of five years, of a special Research Officer to carry out an aetiological investigation of contagious bovine pleuro-pneumonia. A good deal of time and attention has already been given to the problem at the Kabete Laboratory, where proper help and guidance will be given to the special research worker whom it is proposed to appoint. Investigation into this disease is also proceeding in Northern Rhodesia, with assistance from the Colonial Development Fund, as a preliminary to a campaign to eradicate it from the Barotse Province; but the Kenya research will be directed mainly to improving the methods of diagnosis of the disease, and will be thus complementary to that in progress in Rhodesia. Close touch will be maintained between the two series of investigations. The clear diagnosis of the disease, the Report adds, is still difficult, if not impossible, and there is no doubt as to its economic importance to cattle owners, not only in Kenya, but in the other stock-raising countries in Africa. Owing to the occurrence of the disease, many pastoral areas in both East and West Africa have to be kept closed and strict quarantine measures and control over the movement of stock have to be enforced.

Nigeria (Experimental Farm).—A free grant of £3,400 is being made to provide for the capital cost of a small central experimental farm at Ilorin, and unit farms in Ilorin Province, which are designed to test the possibility of introducing a mixed farming system, including animal husbandry, in the agriculture of the Middle Belt (Ilorin, Kabe and Benu Provinces). At present there is no local breed of cattle which can withstand tsetse-fly; and the existing methods of shifting cultivation, practised by the natives, tend to diminish the productive capacity of the land through the replacement of forest growth by coarse grasses. If successful, therefore, the experiment should lead to far-reaching results in the Middle Belt of Nigeria and should be of benefit elsewhere in West Africa.

Falkland Islands (Pastures).—Considerable research in the improvement of grasslands has been carried out in recent years and the outstanding pioneer in the work has been Dr. Stapledon of the Welsh Plant Breeding Station

at Aberystwyth. His work has proved beyond question that pastures, closely similar to those found throughout the Falkland Islands, can be brought to a far greater carrying capacity than was formerly believed to be possible. Though efforts are being made to develop alternative industries in this Colony, it is considered that the Colony must continue to depend in the main for its prosperity on the breeding of sheep for wool. The standard of sheep breeding has been raised greatly in recent years, but the farmers are much handicapped by poor pastures. Arrangements are, therefore, being made for a member of Professor Stapledon's staff to visit the Colony and report on the measures to be taken to improve the grazing lands. A free grant of £3,180 is to be provided from the Fund to cover the full cost of the visit of the expert, and one half the cost of experimental re-grassing.

. . . . .

[The amount of assistance from the Colonial Development Fund recommended by the committee towards the improvement of the livestock conditions of the Colonial Empire must be declared pathetically small, in view of the paramount position of livestock in the economy of the several countries. The above items found worthy of support and reproduced very fully as described in the Report, form but a trivial portion of the problems, comprising those of breeding, nutrition and disease, as they effect the Colonial Empire generally or, in any case, the territories of groups of countries within the Empire. Meanwhile, the expense of solving these problems, if they are to be solved at all, must fall on the revenues, often very meagre, of each country. Out of assistance totalling £810,045 approved in this report, £16,763 only comes under the heading (*a*) "Agricultural development, etc.," and £18,485 under (*b*) "Scientific research, etc." Support out of such niggardly sums is not likely to promote materially the welfare of cattle owners in the Colonial Empire.]

J. T. E.

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County of Banff

REPORT OF THE VETERINARY OFFICER FOR 1936

The report of the veterinary officer for the County of Banff for the year 1936, is incorporated in the Seventh Annual Report of the Medical Officer of Health, Banffshire.

The importance of the Chief Veterinary Officer's work under a county council is generally acknowledged to-day and constitutes a valuable annual report in itself.

The report for the year under review indicates that the veterinary officer is by no means satisfied with existing conditions, and he would welcome the more whole-hearted support and co-operation of the veterinary practitioners and stockowners in the eradication of diseases communicable to man, more especially that of tuberculosis. Much educational work is evidently required among the stockowners throughout the county. Registered dairies were all examined three times and non-registered premises twice, during the year. Meat inspection and laboratory work are also carried out by the veterinary officer for the county. No reference is made to any research work into the cause of grass sickness in horses.

N.V.M.A. DIVISIONAL REPORT

Lancashire Veterinary Association*

SUMMER MEETING AT CHESTER

There was a large attendance of members and friends on the occasion of the annual summer meeting of the Association which was held at Chester on July 15th, 1937.

Among those present were the following: The President and Mrs. Sumner, Mrs. Lax, Major F. Chambers, Professor J. F. Craig, Major W. Barr, Mr. and Mrs. F. G. Edwards, Mr. and Mrs. G. O. Davies, Mr. and Mrs. G. Mayall, Mr. and Mrs. T. Wilson, Mr. and Mrs. J. Lyon, Mr. and Mrs. H. G. Hewetson, Mr. and Mrs. H. D. Heggarty, Mr. and Mrs. E. Greenway, Mr. and Mrs. J. Storrar, Mr. and Mrs. G. Tullis, Mr. and Mrs. R. S. Howe, Mr. and Mrs. R. C. Locke, Mr. and Mrs. H. T. Hughes, Miss P. Stubbs, Miss E. H. Patchett, Mrs. H. V. Locke, Miss L. Dooley, Messrs. G. H. Locke, A. H. Locke, J. C. Baird, H. S. Pearson, J. Newhouse, R. J. Thomas, A. J. Wright, A. L. Mullen, J. Birtwistle, A. H. Leyland, H. H. Aldred, C. F. Shawcross, B. Edwards, Warwick Fowle, R. Hughes, A. B. Kerr, H. R. Hewetson, E. D. Greenway, P. Richmond, C. N. Jones, R. L. Greenhalgh, E. A. Pearce, P. J. Mitchell, J. O. Powley, — Powley, Junr., W. Kendrick, H. H. Ferguson, A. L. Bragg, E. W. Prescott, J. McWilliam, R. F. Bett, E. A. Comer, T. M. Alexander and P. A. F. O'Neill.

Apologies for inability to be present were received from Captain T. G. Millington, R. Simpson, W. Woods, Sir F. T. G. Hobday, C. T. Trevers, J. H. Wood, J. Holroyd, A. B. Mattinson and H. T. Matthews.

*Received for publication August 19th, 1937.

The programme was opened when members and friends met for luncheon at the Queen Hotel. After lunch the ladies withdrew to the lounge to meet members of the Ladies' Committee, and to make the arrangements for the afternoon.

A general meeting of the Association was held. The motion that the minutes of the previous general meeting be taken as read was carried, and continuing the business, the following were duly elected to membership of the Association: Messrs. J. Lyon and J. McWilliam, of Nantwich; R. N. Clunie, of Lancaster; J. F. D. Tutt, of Winchester; E. A. Pearce, of Frodsham, and Miss E. H. Patchett, of Chorton-cum-Hardy. Messrs. G. Holmes, of Stockport, and J. Dobbinson, of Prestwich, were proposed and elected student members. In the absence of any correspondence and other business, the meeting was then declared closed.

The arrangements made for the entertainment of the ladies, which included a sail on the River Dee to Eccleston Ferry and a visit to Eaton Park and Gardens had to be abandoned owing to unfavourable weather conditions. Instead, the afternoon was spent in Chester in various ways. Many of the visitors formed parties and paid a visit to the cinema.

Following the general meeting, the members proceeded by road to the Duke of Westminster's Home Farm, at Aldford, where arrangements had been made for the demonstration of a series of surgical operations which were successfully performed by Major F. Chambers, O.B.E., F.R.C.V.S., of Wolverhampton. Three operations on equine subjects were undertaken. The first, a hunter, was cast, and the ventricle-stripping operation performed under general anaesthesia as the treatment for roaring. Williams's operation for poll evil was next performed on a draught horse, which was followed by the castration of a four-year-old cryptorchid. Messrs. A. J. Wright and T. Wilson supervised the casting of the horses, which assisted the smooth working of the demonstration.

Following the operations, a short time was spent in discussion, during which Major Chambers replied to questions put by members, and indicated the success which might be expected from such surgical measures. At the conclusion of the proceedings at the Home Farm, the President proposed a vote of thanks to Major Chambers, who had contributed so markedly to the success of the meeting, and appreciation was shown by the members present. Appreciation must also be recorded of the facilities so kindly placed at the disposal of the Association by the Duke of Westminster.

Later, members joined the ladies at the Queen Hotel, where an invitation to tea was extended to the company by the President and Mrs. Sumner, after which Mr. H. R. Hewetson thanked the President for his hospitality. Mr. Sumner, in his reply, thanked those who had assisted him in making the arrangements for the meeting, which was closed at the conclusion of tea.

J. C. Baird, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 25th.—Annual General Meeting, Society of Veterinary Practitioners (Division, N.V.M.A.) Grand Hotel, Birmingham, 2.15 p.m.

Sept. 27th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Sept. 27th.—Royal Veterinary College: Formal Opening of new Session at Camden Town. Lieut.-Colonel P. J. Simpson, D.S.O., T.D., J.P., F.R.C.V.S., to attend as President of the College.

Oct. 1st.—R.A.V.C. Old Comrades' Association: Annual Dinner, Anderton's Hotel, Fleet St., E.C.4; 7.30 p.m.

Oct. 4th.—N.V.M.A. Committee Meetings.

Oct. 5th.—**N.V.M.A. Council** and Committee Meetings.

Oct. 6th.—R.C.V.S. Committee Meetings.

Oct. 6th.—Victoria Veterinary Benevolent Fund Council Meeting.

Oct. 7th.—R.C.V.S. Committee Meetings.

Oct. 7th.—Central Division, N.V.M.A., meetings at the Conway Hall, Red Lion Square, W.C.1. Special General Meeting, 6.30 p.m.; Annual General Meeting to follow.

Oct. 8th.—**R.C.V.S. Council** and Committee Meetings.

Oct. 13th.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, Loughborough, 2.30 p.m.

Nov. 9th.—**Royal Veterinary College: Opening of new buildings at Camden Town by His Majesty King George VI.**

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PERSONAL

Appointment.—Mr. Allan Leslie, F.R.C.V.S., son of Mr. and Mrs. William Leslie, Hamewith, Culter, Aberdeenshire, who was formerly veterinarian at Canterbury Agricultural College, Lincoln, New Zealand, has been appointed officer to the Federation of Taranaki Dairy Factories. This is the first appointment of the type made in the organisation of a complete system of veterinary service for Taranaki. Mr. Leslie, who recently returned to Christchurch from Australia, will be stationed at Eltham. He graduated at Edinburgh in 1925, and held various veterinary appointments in Great Britain before going to Canterbury eight years ago.

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Retirement.—Mr. Thomas Parker, F.R.C.V.S., retires at the end of the month from the position of Chief Veterinary Officer to the Corporation at Newcastle-on-Tyne. At a recent meeting of the Newcastle City Council, Mr. Horace Thornton, B.V.Sc. (Liv.), M.R.C.V.S., D.V.H., Assistant Veterinary Officer to the Corporation, was appointed to succeed Mr. Parker in the post.

* * * * *

OBITUARY

R.C.V.S. Obituary

Howatson, Thomas Charles, Rhuddlan, Flintshire. Graduated New Edinburgh, May 23rd, 1898. Died September 18th, 1937; aged 62 years.

. . . . .

Dr. Raimundo L. J. Morello

It is with the deepest regret that we have to report the death, in London, of Dr. Morello, graduate in Veterinary and Agricultural Science, who had just arrived as Agricultural Attaché to the Argentine Embassy.

Dr. Morello, after some time spent in Reading studying the Dairy Industry, returned to Argentine where he graduated as a Doctor in Veterinary Science and subsequently made a great name for himself in the Government Service, with the result that he was sent to the Embassy in this country to assist Dr. Garcia Arias.

During the short period he had been in London, he endeared himself to all with whom he came in contact, and it is not too much to say that, had he lived, he would have been one of the most popular officers that Argentina had ever sent to this country.

Our deepest sympathy is offered to his family, relations, and to his many friends both in this country and in Argentina.

* * * * *

ERADICATION OF DISEASES OF ANIMALS

The Ministry's Campaign

January 1st, 1938, is the date fixed by the Ministry of Agriculture for the commencement of its campaign for the eradication of animal diseases, starting with a large-scale attack on tuberculosis. In the latter connection a survey throughout the country of the incidence of tuberculosis is to be carried out by the Diseases of Animals branch of the Ministry which will in future form the headquarters of the new State Veterinary Service. County and local authorities, which will have to transfer many of their veterinary services to the central department, are now being asked to furnish detailed information on the control exercised within their areas.

"These authorities," observes the *Farmers' Weekly*, "are requested to state by whom the inspections of dairy cattle are made, and whether they extend to herds producing milk for butter and cheese; the frequency of the inspections; the arrangements made for *post-mortem* examinations; and the slaughter of infected animals, and so on.

"Information is being collected, by means of the special census, of the way in which individual herds are maintained. This will be used in the compilation of a list of all those herds which are self-contained and are likely, therefore, to suffer little risk of tuberculous infection. All such herds will then be subjected to the tuberculin test and owners will be encouraged to register under the Attested Herds Scheme. Where a number of herd tests reveal a low incidence of tuberculosis, the Ministry will attempt the development of Attested Herd Areas, as proposed in the Agriculture Bill, and these will be used as great reservoirs for disease-free breeding stock. At least 75 per cent. of the herds or animals will have to qualify for attestation within these areas. The preliminary survey will involve the testing of some tens of thousands of animals, and it is thought that the work will take two years to complete.

"Meanwhile, boundaries, markets and the probable economic effects of area control will be carefully studied to provide the basis for the second stage of the plan—the creation of the 'closed' areas. Alternative markets will be provided where necessary. All movements into an area, as already explained, will be controlled, but movements inside an area, except in the case of the few remaining untested herds, will be quite free. It is anticipated that the compulsory testing of herds in the areas will gradually be relaxed until they are only necessary once in three years. On the fringe of an area, however, cattle will have to be tested at the usual periods. Later, all attested herds will be blood-tested, free of charge, for contagious abortion. Owners of other herds will be able to use the special facilities offered at their own expense.

"Ministry experts think that the plan, though it is conceived on a far-reaching scale, will involve less difficulty than was at one time supposed. One encouraging sign is the rapid increase in the number of attested herds in England and Wales. The State Veterinary Service will take over the routine veterinary inspection of all dairy herds, and inspections will become more frequent in many counties. Where local authorities have fulfilled their obligations under the disease and clean milk regulations there will be little, if any, change. The aim is to bring the services in the allegedly 'backward' counties up to the standard of the most progressive. The new department will make all inquiries into the diseases scheduled under the Diseases of Animals Acts and will administer the Tuberculosis Order, including the slaughter of infected animals and the payment of compensation to owners. It will also undertake the examination of cattle by a veterinary inspector when notified by a medical officer that tuberculosis, or any infectious disease, is caused or is likely to be caused by the consumption of milk produced by the herd. The tuberculin testing and inspection of cattle under the Milk (Special Designations) Order will not affect the existing powers of local authorities to grant licences for the use of milk labels such as 'Tuberculin Tested' and 'Accredited.'

"Arrangements to curb the spread of disease in poultry stocks will also come into effect on January 1st. The Ministry will offer breeders and distributors of poultry free testing for such diseases as B.W.D. and fowl typhoid, and free *post-mortem* services. In some cases, the scheme will involve a check on distribution. These arrangements are without prejudice to the recommendations to be made by the Poultry Technical Committee who are expected to favour some form of control over the production of breeding stock, chicks and hatching eggs."

* * * * *

COUNTY COUNCILS ASSOCIATION AND THE VETERINARY SERVICES

At a meeting of the Executive Council of the County Councils Association held at the end of July, and the proceedings of which are reported in the current issue of the Association's *Official Gazette*, there was accepted a report from the Agricultural Committee in the course of which the following passages occurred: "The com-

mittee considered the Government's agricultural policy as outlined by the Minister of Agriculture in the House of Commons on May 27th, with particular reference to the proposed centralisation of veterinary services and the extension of Exchequer grants for land drainage. . . .

"In the course of an introductory statement, the Chairman said that, so far as the county councils were concerned, the proposed centralisation of veterinary services was the most important feature of the Government's agricultural policy. For some time the Association had realised the importance of establishing, in the interests of pure and clean milk supplies, whole-time county veterinary services throughout the country, and, with this object in view, they had made repeated but unsuccessful attempts to secure an Exchequer grant to be distributed in such a manner as would spread the financial burden equitably between county and county and between producing and consuming areas.

"A considerable advance in the appointment of whole-time veterinary officers had nevertheless been made in the wealthier counties, but for the most part the county councils appeared to have concentrated their efforts upon the public health aspect of the veterinary service, with the result that there had been comparatively little progress in the eradication of animal diseases. Moreover, as some 309 local authorities were now responsible for the discharge of duties under the Diseases of Animals Acts and Orders, the difficulty of achieving that degree of uniformity of administration which was envisaged by the Cattle Diseases Committee of the Economic Advisory Council would be appreciated, and it seemed obvious that the Government's proposals would at least produce an improvement in this respect.

"In these circumstances, the Government were apparently determined to press forward with their scheme, which was estimated to involve a saving of £170,000 a year to the rates and, therefore, he thought that the committee would do well to direct their attention chiefly to the administrative difficulties that might be expected to arise.

"Subsequently there was a prolonged debate in which Mr. Anderson, Mr. Argles, Mr. Davidson, Mr. Dent, Sir Philip Henriques, Sir Edward Holland, Mr. Hotchkiss, Sir Joseph Lamb, Mr. Langford, Lord Malmesbury, Major Rabagliati, Mr. Small and Mr. Stratton, participated.

"Mr. Dent said that the issue of licences under the Milk (Special Designations) Order, 1936, would appear to be the most important function to remain vested in county councils, and he was anxious that nothing should be done to imperil the smooth working of the Order in counties where satisfactory arrangements for its administration had been made. As instances of the steps taken to avoid friction, he mentioned that the Essex veterinary officers, who were under the control of a joint committee of the Public Health and Diseases of Animals Committees, undertook milk sampling in the course of their routine inspections, and that this procedure met with the approval of farmers, who naturally objected to constant official visits to their premises. Further, as regards the condition of cowsheds and other buildings, co-operation had been established between the county veterinary staff and the sanitary inspectors employed by the district councils, who were the responsible authorities under the Milk and Dairies Order, 1926, and any interference with such arrangements as he had described would be most harmful.

"Continuing his argument, Mr. Dent expressed the hope that the veterinary officers now employed by progressive counties would not be transferred to other areas for the purpose of organising the new service. These officers had succeeded in establishing and maintaining amicable relations with the farming community, who now looked upon them as friendly advisers rather than as officials, and this relationship should not be disturbed.

"Finally, it was important to bear in mind that county committees charged with the duty of issuing licences under the 1936 Order had to reconcile such conflict of opinion as might exist between the veterinary staff and the County Medical Officer. This was satisfactorily achieved under the present system, and, to ensure continuity of policy, it was essential that in future there should be a close and well-defined relationship between the officers of the county councils and those of the Ministry.

"Mr. Argles expressed the view that the Government's proposals would meet with considerable opposition, and he thought that the introduction of a State Veterinary Service would endanger the friendly relationship to which Mr. Dent had referred.

"Sir Joseph Lamb and Mr. Langford supported the scheme for centralisation, the former adding that the present position between progressive and backward areas was unsatisfactory and that it was to the interest of the country as a whole that the veterinary service should be more uniformly administered. Mr. Anderson and Mr. Small, on the other hand, opposed the scheme as being contrary to the principles of local government and to the policy advocated by the Association in recent years.

"Sir Edward Holland suggested that the matter should be examined from a wider aspect than that of county administration. The general efficiency of the veterinary service was the principal consideration, and, as the Government had seemingly decided, after reviewing all the arguments put before them by the Association's representatives, that centralisation was necessary for the attainment of this objective, little or no useful purpose would, in his opinion, be served by passing a resolution for or against the scheme, however much the loss of an important service might be deprecated.

"Replying to the points raised during the debate, the Chairman said that the various administrative problems to which attention had been drawn were being carefully examined by the Ministry of Agriculture in consultation with representatives of the Association and other interested bodies.

"Apart from meat inspection and the inspection of markets, all the veterinary duties of the local authorities would, it appeared, be transferred to the Ministry, and the county veterinary staffs would be taken over by the Department for this purpose. So far as possible, however, it was the Government's intention that these officers should remain in the areas in which they were now employed. Speaking generally, therefore, farmers would not need to accustom themselves to a different set of officials, and there was good reason to anticipate that existing relationships would not be materially disturbed.

"In conclusion, the Chairman reminded the members that the Association had recognised, in the policy previously pursued by them, the desirability of encouraging the best type of men to enter the veterinary service, and he expressed the view that the Government's proposals were calculated to achieve this aim by ensuring that

salary scales and conditions of employment, including superannuation, would henceforth be the same throughout the country.

"It was resolved—

(*a*) That, having regard to the Government's expressed intention of submitting to Parliament, after careful examination of all the circumstances, a comprehensive scheme for the eradication of animal diseases, the committee do not consider it desirable or useful for them to indicate either approval or disapproval of the proposals to centralise the veterinary services in this connection.

(*b*) That, in the opinion of the committee, the interests of the county councils will be best served by concentration upon the administrative and technical problems that are likely to arise from the Government's scheme, especially in regard to the administration of the Milk (Special Designations) Order, 1936, and the future relationship between county and Departmental staffs, and that for this purpose a consultative committee [names stated] be appointed to collaborate with the Ministry of Agriculture."

* * * * *

N.F.U. AND THE GOVERNMENT'S MILK POLICY

The Council of the National Farmers' Union has endorsed the following resolution adopted by its milk committee:—

"That this committee, having given full consideration to the Government's White Paper on Milk Policy in the light of views thereon expressed of the county branches of the Union, registers the strongest protest against the indefensible departure of the Government from its previously declared policy, the promised introduction of which induced the overwhelming majority of producers to give their support to the Milk Marketing Scheme; and in view of the intense dissatisfaction evinced by the county branches recommends the council to call for the immediate withdrawal of the White Paper Policy and the introduction in its place of the Levy Subsidy Policy announced by the then Minister of Agriculture in July, 1935.

"This committee is gravely concerned at the circumstances that the While Paper Policy, by its failure to provide for fair remuneration for producers along the lines adumbrated by Mr. Elliot, renders the likelihood of reducing prices to consumers remote, and for that reason would prejudice the steady expansion of liquid milk consumption; while at the same time the policy will obviously affect the position of the home dairy farming industry by restricting home output in favour of oversea competitors.

"Further, this committee is of the opinion that the White Paper Policy if not promptly withdrawn will create acute antagonism between interests in town and country in respect of the operation of the Import Duties Act, and by failing to secure for home producers first place in their own market will cause serious embarrassment in the future relations between home and Dominion producers."

* * * * *

EGG MARKETING PROPOSALS

The report of the joint committee of the National Farmers' Union and the National Poultry Council on the subject of egg marketing is published. The joint committee was appointed last May to explore the possibilities of formulating principles of marketing reform which would receive the support of poultry keepers throughout the country. There was remitted to the committee an intimation from the Minister of Agriculture that it would be premature for him to make a declaration in regard to financial assistance in advance of the submission of definite proposals for marketing organisation.

A series of recommendations appended to the report embody a scheme of regulation, which the committee has decided to confine for the present to the marketing of eggs, and which would be framed under the Agricultural Marketings Acts, 1931 and 1933. The scheme provides for the establishment of a register of producers and for the exemption from registration and the operation of the scheme of producers who, for the time being, have in their possession not more than 60 laying stock, that is, of domestic fowls and/or ducks six months old and over.

The scheme would be administered by a board of 14 members, of whom five would be elected as national representatives, seven as regional representatives, and two co-opted in accordance with the Agricultural Marketing Act, 1933. The election of the board would be by the direct vote of registered producers.

The board would have the general powers available under the Act (*a*) to determine the kind, variety, or grade of eggs which may be sold by registered producers; (*b*) to regulate terms of sale; (*c*) to determine the agents of sale; (*d*) to determine how eggs are to be graded, marked, packed, stored, adapted for sale, insured, advertised, or transported by or on behalf of registered producers; (*e*) to inspect premises of authorised dealers; (*f*) to obtain and circulate information; (*g*) to promote co-operative packing stations. They would also have power to exempt from all or any of the provisions of the scheme such registered producers and such sales of eggs as they might determine.

It is suggested that the ultimate submission of the scheme should be contingent on financial assistance being given by the Government, and that that assistance should be given through packing stations authorised by the board by way of relief of overhead charges and applicable according to the nature of the service undertaken. The board would have the power to acquire contributions from registered producers towards the expenses of the scheme, and of paying compensation, borrowing, and granting or guaranteeing loans.

* * * * *

THE VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY

For many years past the annual reports of the above Society have borne witness to the value, to veterinary practitioners, of an organisation affording legal aid and generous financial protection in those unfortunate cases which arise, sooner or later, in the experience of almost everyone engaged in general practice, where, even though not in fault, the practitioner is called upon to defend his professional actions and prestige in a Court of Law. It is remarkable, therefore, that even with this important adjunct and its appeal as a benevolent institution, in which capacity the Society accomplishes a great work of an indispensable character, the membership languishes at a figure representing but 10 per cent. of the profession.

We trust, however, that publication of the following heart-felt tribute—representative of many—to the benevolent work of the Society from one of its "pensioners" since 1918, may stimulate the interest of the remaining 90 per cent., and induce many of them to support, by membership, this admirable institution which offers the double benefits to which we have referred. The text of the letter is as follows:—

"Please convey my deep appreciation to your generous Council for their kindness which relieves my anxiety. I am now 86 and ill, and life is a trial. What, *through so many years*, would have been my lot but for the Veterinary Benevolent Society? Please accept my *sincere gratitude* for all you have done for me."

* * * * *

WINDSOR GREAT PARK RIDING PERMITS

In view of the great increase in the number of persons who ride in Windsor Great Park, and to secure some control over the riders, the Commissioners of Crown Lands have decided in future to allow only riders with permits to use the park and the forest. Permit holders will have to pay a licence fee of £1 a year per horse, and will have to sign a document agreeing to certain conditions. Riding will no longer be allowed on the grass in the Long Walk, nor in various other parts of the park.

The various riding establishments in Windsor, Ascot, Sunninghill, Blacknest, Egham, etc., will have to obtain licences for every horse they wish to send into the park. Private individuals will be granted permits on exactly the same conditions as the livery stables. The permit states that riding will be permitted only in that part of the park known as the Deer Park. Riders must enter and leave the park by Queen Anne's Gate, Double Gates, Bishopsgate, Blacknest Gate, Prince Consort's Gate and Forest Gate.

Riders entering the Deer Park by way of the Long Walk will have to proceed along the metalled road until they reach the Double Gates, and those entering by way of Blacknest must remain on the road until reaching Cumberland Gate. Riding on the grass verges of the roads or on the flying ground at Smiths Lawn will be prohibited, as well as riding in the bracken or any of the grass rides. The regulations prohibit riding at a faster pace than a "hand canter," riding more than four abreast, or the breaking in of horses.

Persons who have "No. 1 keys" will be allowed to use the metalled track between Wood Pond Gate and Sandpit Gate in South Forest, the metalled road between High Standing Hill Gate and Forest Gate, and China Island Ride between Blacknest Gate and Prince Consort's Gate.

* * * * *

GROWTH FACTORS

A discussion on "Growth Factors," which took place at the Royal Society on Thursday, June 24th, is reported as follows in the issue of *Nature* for July 24th:—

"For a number of years, sporadic reports have been published by workers in the fermentation industries and bacteriology that the growth of yeast and bacteria depends not only on the provision in the diet of gross sources of energy and nitrogen, but also upon illusive materials—'bios,' 'accessory growth factors,' akin to the 'vitamins,' responsible for the functioning of special phases of animal metabolism or even for the growth of animals. More recently, these tentative findings have been reinforced by workers in other specialised fields, for example, in botany and protozoology, and, by the use of modern biochemical technique and knowledge, it would now appear that the case established in the nutrition of animals is equally established in the nutrition of the most diverse varieties of cells; namely, that all cells from the lowliest bacterium to the cells of the highest animals are enabled to carry out the series of reactions between the sources of energy and nitrogen, which result in the production of energy and growth, only by the agency of other substances mostly of a nature akin to those already described in animal metabolism—vitamins. The only notable difference between the various forms of life is that these accessory substances are normally synthesised by some cells but not by others, and thus in the former case these substances need not be supplied in the nutrient diet.

"The proceedings were opened by Professor F. Kögl, of Utrecht, with a review of the present state of knowledge of the plant hormones, auxin *-a* and *-b* and heteroauxin (β-indolylacetic acid). The auxins were first thought to exert their effect on cell elongation, but now it is recognised that they regulate plant growth in many ways. Auxin-*a*, for example, is thought to account for the phenomenon of phototropism. Auxin-*a* lactone loses its activity under the action of ultra-violet light, and thus the shaded side, containing a greater concentration of activity, would elongate and produce the effect of phototropism. The action of heteroauxin seems to be primarily associated with the formation of roots on stem cuttings. This action is, however, not dependent on chemical structure, since a number of unrelated substances have a similar effect, recalling the non-specificity of oestrogenic compounds described by Dodds and co-workers.

"Professor Kögl also gave an account of his 'biotin,' a sulphur-containing substance of great potency which may be the chief component of 'bios,' originally described by Wildiers as a necessary growth factor for yeast. Biotin has also been shown to have an effect on the growth of higher plants.

"Dr. P. Fildes (London) reviewed the subject as it appears to the medical bacteriologist, tracing the evolution of the vitamin concept for bacteria from Twort and Ingram's growth factor for Johne's bacillus (1912) to the present time, when vitamin B_1 has been proved to be essential for *Staphylococcus* and propionic acid bacteria. and nicotinic acid or cozymase for *Staphylococcus* and the influenza bacillus. He laid stress on the facility with which bacteria can adapt themselves to altered nutritional conditions, and ascribed the fact that parasitic bacteria specially require growth factors to a loss of synthetic function which has resulted from long association with an environment in which these factors are preformed. These dependent bacteria can readily be trained back to their 'original' state, in which they can synthesise the factors and so do not require to be supplied with them. In a series of different species of bacteria, each ultimately requiring cozymase for growth, it was shown that the complexity of the nutrients from which cozymase can be synthesised depends upon the synthetic power of the bacteria at the time of examination.

"M. André Lwoff (Institut Pasteur, Paris) pointed out that certain bacteria and Protozoa cannot grow without a supply of haemin, because they are unable to synthesise it from iron compounds in the nutrients. The importance of haemin is ascribed to its function as a stage in the synthesis of cytochrome in Keilin's system. Its effect is to increase greatly the oxygen consumption of organisms starved of it.

"M. and Mme. Lwoff have demonstrated that the long-known 'vitamin factor' of the influenza bacillus is none other than Harden and Young's cozymase or Warburg's co-enzyme. Metabolic studies have shown that cozymase acts as a codehydrogenase for various substrates and much increases the oxygen uptake of influenza bacilli and anaerobic glycolysis. Both haemin and cozymase function as bacterial growth factors as components of the dehydrogenase-cytochrome system of Keilin and Warburg.

"Mr. B. C. J. C. Knight (London) gave an account of the *Staphylococcus* and *Sporogenes* factors referred to by Dr. Fildes. He showed that the former consists of nicotinic acid, a constituent of cozymase and of the two halves of the vitamin B_1 molecule—the pyrimidine and thiazole rings. The activity of each compound depends strictly on certain chemical configurations. The *Sporogenes* factor has not been finally determined, but there is evidence that it may have a much wider importance than merely the regulation of the metabolism of the obligate anaerobes.

"Dr. G. M. Richardson (London) described uracil, a component of nucleic acid, as an essential factor in the anaerobic growth of *Staphylococcus*. Uracil is synthesised by the organism aerobically, and, therefore, under these conditions its effect on growth cannot be demonstrated. Anaerobically, however, the synthetic power of the organism is sufficiently depressed to make the demonstration possible. No metabolic function has hitherto been ascribed to uracil.

"In the discussion which followed the more formal proceedings, there appeared to be complete agreement between the various speakers not only in detail but also in the wider implications of the discussion. Dr. E. R. Holiday (London) referred to the demonstration of nicotinic acid in Knight's crude *Staphylococcus* factor by means of absorption spectra. M. Lwoff recalled other factors which have been found by his colleagues in the Pasteur Institute, namely, the forms of sulphur necessary for the growth of certain fungi (Volkonsky) and the sterols found by Mlle. Cailleau to be necessary for flagellates."

* * * * *

Erratum.—We regret that, on page 1201 of our last issue, in our reference to Mr. J. F. D. Tutt, F.R.C.V.S., of Winchester, as the President of the Veterinary Medicine and Surgery Section, N.V.M.A. Congress, 1937, his place of residence was erroneously given as Southampton.

Correspondence*

FOOT-AND-MOUTH DISEASE

To the Editor of the Veterinary Record

Sir,—In the *Veterinary Record* of September 18th, page 1217, there appears under the heading "Foot-and-Mouth Disease" a reference to a recent outbreak of the disease in Holland, after a period of immunity of three years.

I consider that we have reasons for doubting the authenticity of the statement that Holland has been free from this disease for such a long period. It may help to clear matters to quote the following extract from the regulations governing the meat inspection of the United States Department of Agriculture, Bureau of Animal Industry, which have been in force since August 1st, 1935, to prevent the introduction into the United States of rinderpest and foot-and-mouth disease. It is stated that they have determined that the disease exists in the Netherlands, France, Belgium, Germany, Denmark, etc., etc.: "Wherefore by said Section 306 (*a*) the importation into the United States of cattle, sheep or other domestic ruminants or swine or of fresh, chilled or frozen beef, veal, mutton, lamb or pork, from the countries above named is prohibited."

Unless Holland has, for a reasonable length of time, adopted the methods of the U.S.A. and Great Britain of compulsory slaughter of diseased and in-contact animals, it is not logical to state that the country had even a short period of immunity. It has been proved in Germany and elsewhere that recovered animals remain as carriers of this disease indefinitely and, therefore, quarantine answers very little good purpose. May I, as one who has resided for nearly a quarter of a century in a vast cattle country which, along with Colombia, are the only two republics of South America scheduled as free from foot-and-mouth disease, express my opinion that unless Great Britain adopts rigid methods similar to those of the U.S.A. so as to prevent the importation of cattle, etc., from Holland and other infected countries, the Government of Great Britain must be prepared to continue spending huge sums of money in order to try and eradicate the disease. There may be imported Friesians in this country to-day, apparently healthy, acting as carriers of this much dreaded and costly disease.

Yours faithfully,
Edward Morgan,
(*C.V.O., Venezuela, S. America.*)
23, Crest Road, Hayes,
Bromley, Kent.
September 18th, 1937.

* * * * *

THE NEED OF MODEL BYE-LAWS FOR CATTLE MARKETS

To the Editor of the Veterinary Record

Sir,—More than 40 years ago the Ministry of Health issued, for the guidance of local authorities, a series of model bye-laws for the rational organisation and humane conduct of slaughterhouses, advising the authorities to adopt them, thereby making them legal. As a consequence, the large majority of local authorities has adopted them, to the benefit of the public, the slaughterhouse officials, and the beasts themselves.

In our city we are shortly laying out a new cattle market on a new site, to replace the present very cramped and overcrowded one. Therefore it seemed to me a very favourable opportunity

*Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

for revising our bye-laws with regard to cattle markets as I can see opportunities for much improvement of our present arrangements, which entail much avoidable cruelty and present many possible chances of spreading communicable disease. After one or two enquiries at our municipal offices I discovered, much to my surprise, that apparently we have only one bye-law dealing with the cattle market. This is quite good as far as it goes, but it deals with only one aspect of a much larger problem. (Incidentally, the city council recently prosecuted an owner under this bye-law—we lost the case, after it had occupied the magistrates nearly the whole day. Had our veterinary inspector been the sole responsible official, the animal would not have been admitted to the market in the first place.) Then I enquired of the Ministry of Agriculture whether they issue any model bye-laws, and again, much to my surprise, I found that not only had they never done so, but that they have never considered the advisability of doing so.

In view of the, at-long-last, national concern over our home-grown food supplies and the amount of avoidable disease in our herds, and of the passage of the Livestock Industry Bill, the time seems ripe for overhauling the administration of our cattle markets and the framing of regulations for their business and humane conduct. In which case the lead should surely be taken either by the Ministry of Agriculture or the newly-appointed Livestock Commission.

My own experience of cattle markets is limited. (For many years I was inspector for the small market at Penzance, and since my retirement from practice I have paid occasional visits to our large Exeter Market.) Consequently the views of your readers with wider experience and more recent knowledge would be valuable and interesting.

Our bye-law is as follows: No person shall bring into the cattle market any animal which, in the opinion of the veterinary inspector, is old, emaciated or diseased, and unfit for human food. The following would be my "sketchy" suggestions for additional bye-laws:—

(*b*) No overstocked cows shall be admitted to the market, whether milk is running from the teats or not. (An overstocked udder is one in such a condition as would not normally be found in a dairy herd. The veterinary inspector to decide in case of doubt.) Or, better: All dairy cows to be milked out on entering the market in order to enable the veterinary inspector to examine the udders for disease.

(*c*) No cow to be admitted with a discharge from the vulva. (Most of these are either cases of neglected "afterbirths" or of contagious abortion, and in the latter case spread the disease.)

(*d*) No beast to be admitted with "warbles."

(*e*) No calf to be admitted unless at least ten days old, or with an unhealed navel.

(*f*) No children under 16 years of age to be admitted to the market. (Children with sticks lead to much confusion and cruelty.)

(*g*) All drovers to be licensed. (We find that the efficient whole-time drover is most anxious to be legally licensed and quite willing to pay a small fee; but the Town Clerk tells us we should require an Act of Parliament to enable us to do this. The casual drover is often a man of a bad type, with little knowledge of cattle. And I know, from inside knowledge, that they are a very troublesome problem to the Unemployment Assistance Board.)

In every cattle market the veterinary inspector should obviously be the sole responsible official, which often he is not.

Finally, supposing an authority made bye-laws on the lines suggested above, could it enforce them legally without special Parliamentary powers?

In short, I want the Ministry of Agriculture or Livestock Commission to do for our cattle markets what the Ministry of Health did for our slaughterhouses years ago. For instance: Model bye-law 9 (*b*) for slaughterhouses went further in the promotion of humane slaughtering than the Act of Parliament passed years later, inasmuch as it included *all* animals. In the same way, a model bye-law against overstocking would help us very materially to put down this senseless practice. I am convinced that farmers and dealers will not give it up unless made to do so.

Yours faithfully,

(Councillor) R. Glave Saunders, M.R.C.V.S.

Exeter.

September 2nd, 1937.

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MISS ALEEN CUST MEMORIAL FUND

To the Editor of the Veterinary Record

Sir,—We forward herewith the final list of subscribers to the above Memorial Fund and will be very grateful if you will publish it.

The total sum received amounts to £46 14s. 0d. and once again we would like to thank all the subscribers who have helped towards the formation of this Fund.

The majority of contributors have expressed a wish that the memorial shall be in the form of something useful and we are endeavouring to find the most suitable way of carrying out their wishes.

When these arrangements have been made we will ask you to be so kind as to publish a further announcement.

Yours faithfully,

P. L. Williams,
O. B. Woodward,
(*Joint Hon. Treasurers.*)

Walpole House,
Burton-on-Trent.
September 17th, 1937.

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P. M. Peake,	K. Lamb,
J. F. Kinnear,	G. Taylor,
B. Moss,	A. Wenner,
N. C. Clay,	N. Twyman,
R. Wallis,	C. Sparke and
E. Schofield,	A. J. Moffett.

ADVERTISERS' ANNOUNCEMENTS

"Wellcome" Brand Sulphonamide-P

Following the introduction of "Tabloid" Sulphonamide-P (p-aminobenzenesulphonamide or sulphanilamide), for the oral treatment of streptococcal and other infections, Messrs. Burroughs Wellcome and Co. have made available a powdered form of the medicament issued as "Wellcome" Brand Sulphonamide-P, in bottles of 25 and 100 grammes. The "Wellcome" Brand product is intended for both parenteral and oral administration.

The bactericidal action of Sulphonamide-P against haemolytic streptococci and other organisms suggests its use in a wide variety of veterinary conditions. Clinical experience is at present limited; there appears, however, to be justification for its trial in bovine mastitis. Good results have been reported from its administration in the secondary infections following distemper in dogs. The administration of Sulphonamide-P has also been suggested in such conditions as strangles, streptococcal pneumonia (foals), purpura haemorrhagica, streptococcal joint-ill (cattle), tonsillitis, puerperal septicaemia and septic conditions following operations.

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"P.A.B.S."

Messrs. C. J. Hewlett and Son, Ltd., 35 to 42, Charlotte Street, London, E.C.2, have introduced the new chemotherapeutic compound para-amino-benzene-sulphonamide, which is indicated in puerperal sepsis and other diseases attributed to haemolytic streptococci, under the title "P.A.B.S." Full particulars as to indications, administration and dosage will be forwarded to veterinary surgeons on request.